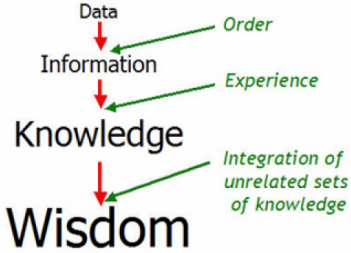
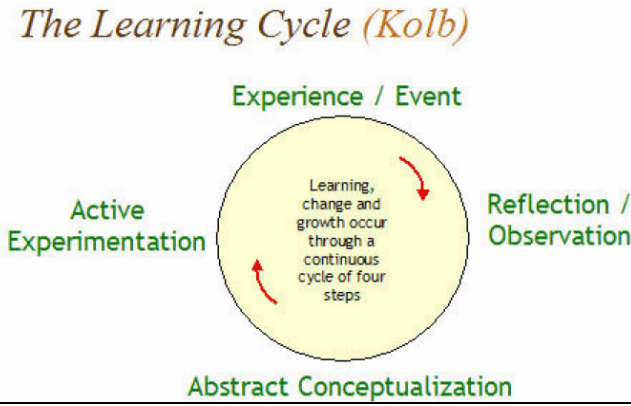
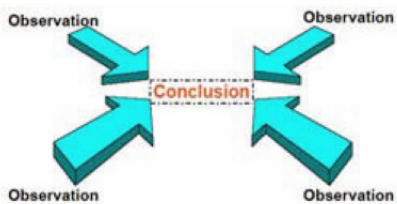



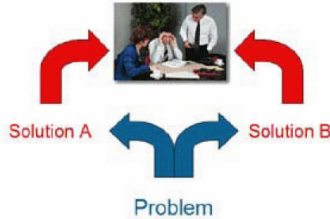
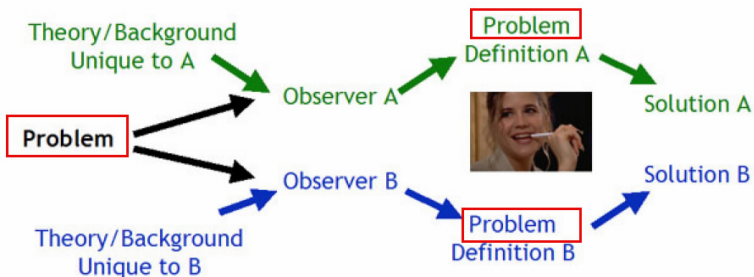
Lesson 1 - The Nature of Information and Systems


What is a System?	A set of (interrelated elements) designed to achieve → objective - a target environment.
What is Information?	(ordered Data) processed through models used to make → decisions
Analyze (The Current state) of (information systems)	Define: <ul style="list-style-type: none"> • Strengths • Weaknesses • Limitations
Hierarchy of Understanding	
What is an Information System?	(Organized combination) of (data resources) that collects information in an organization.
Messy Problems	
A Harder Question	

Lesson 2 - Principles of Enquiry

The purpose of this lecture is to open your minds to the different ways in which issues can be viewed and investigated. It should encourage you to develop an approach in which you can explore your own unacknowledged assumptions and apply objective analysis in a *problem* situation.

Enquiry	Seeking information.
Enquiry Systems	(ES): is a system for producing knowledge.
The Learning Cycle	<p>David Kolb suggests that <i>learning, change</i> and <i>growth</i> occur through a continuous cycle of four steps (Experience, Reflective/Observation, Abstract Conceptualization and Active Experimentation).</p> 
Enquiry System - II	As discussed in "Unbounded Minds" (Mitroff & Linstone):
	Simple Systems
	Inductive – Consensual:
	
	Derives a conclusion from a limited set of observations, which may be:

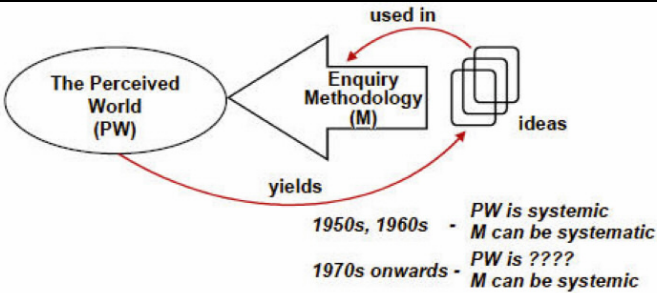
	<p>Analogous: for or example, the situation is a bit simpler than this one, but a little more complicated than that one</p> <p>Historical: for example, in the past, the answer has always been such-and-such, within these tolerances</p> <p>Multiple independently sourced: for example, an average derived from a group of experts</p> <p>*** The conclusion is likely to be: <i>a single number, a fixed strategy, or a single course of action.</i></p> <p>Analytic - Deductive:</p> <div></div> <p>The Analytic - Deductive process share many difficulties with the inductive-consensual process. In particular, there is a belief that there is always one single answer - a <i>number</i> or a <i>truth</i> - which can always be found if only we look hard enough.</p> <ul style="list-style-type: none">• What question <i>are</i> we asking?• What question <i>should</i> we be asking?• When you discover the weaknesses of this approach, try to understand - emergence (that the problem <i>whole</i> will inevitably be greater than the sum of its parts due to <i>messiness</i>, the interaction between its components. <p>Complex Systems:</p> <p>Dialectic:</p> <div></div> <p>Rather than challenge the data, dialectic challenges the subjective assumptions, models and theories by which problems are defined and solutions postulated, and it is the debate itself that an objective solution, compromise or synthesis will be reached.</p> <p>Multiple Realities:</p> <div></div> <p>By placing the observed problem data against a theory or model which is personalized and unique. The result of multiple reality enquiries is a range of representations of the problem and an equivalent range of solutions, which can be applied, synthesized or discarded.</p> <p>Innovative Systems</p> <p>Unbounded Systems Thinking</p>
Unbounded System Thinking	<p>1. Concept of Risk in Enquiry</p> <p>The two simple enquiry systems discussed previously appear to be <i>low</i> risk, in that they produce one single answer.</p> <p>The complex enquiry system has the potential for multiple answers and therefore decisions based upon them seem more <i>risky</i>. Is this true?</p> <p>2. Concept of Risk in Enquiry</p> <p>The two simple enquiry systems discussed previously appear to be <i>low</i> risk, in that they produce</p>

	<p>one single answer.</p> <p>The complex enquiry system has the potential for multiple answers and therefore decisions based upon them seem more <i>risky</i>. Is this true?</p> <ul style="list-style-type: none"> • Messy problems demand a creative approach to their solution.
The Multiple Perspective Concept	 <p>Unless all perspectives are employed, the outcome will be, inevitably, unstable. To paraphrase (and extend) the book:</p> <p>The need is to recognize <i>interconnectedness</i> in the systems with which we, as <i>information professional</i>, are concerned.</p> <p>Therefore, we need to develop our enquiry abilities appropriately to the <i>whole</i> rather than just to the component, taking account of mess and understanding and enquiring upon emergent issues. It is this which will form the base of the next lecture session.</p> <p>The technical perspective refers to analysis and agreement - the logical aspects of a problem. In a sense this is the <i>single perspective</i> from which the earlier enquiry systems approached things. The <i>multiple perspective concepts</i> add two other perspectives:</p> <p>The <i>social</i> or <i>organizational</i> perspective, which enquires from a structural viewpoint.</p> <p>The <i>personal</i> perspective, which takes the individual view.</p>

Lesson 3 - Systems Thinking

This lecture aims to place a rationale behind the need for new methods of enquiry and new approaches, particularly systems thinking and soft paradigms, to systems development.

There's No Silver Bullet	<ul style="list-style-type: none"> • The need for new methods of enquiry and new approaches. <p>Information Systems (IS) development will, almost inevitably, become a process of assembly rather than creation from scratch. The soft paradigm which can support this is based on the systemic process of enquiry</p> <p>defines two types of tasks in software development:</p> <p><i>essential tasks</i> - those which address the difficulty of building the abstract software entity, relating the functions</p> <p>it must perform and the data upon which it will perform them</p> <p><i>accidental tasks</i> - which represent these abstractions in a form interpretable by available technological platforms</p> <p>In a sense, this is a distinction between:</p> <p><i>what the system must do</i> (which is platform independent), and</p> <p><i>how it will do it</i> (which is platform specific)</p> <ul style="list-style-type: none"> • All the advances made so far in software engineering have been directed at <i>how</i> things are done (the accidents) and these will never be able to address the problems surrounding the definition and capture of the essence of the system. • the <i>magical silver bullet does in fact exist</i>, The required culture change is that customers must be prepared to define their needs in terms of what is available <i>off-the-shelf</i> - perhaps having to compromise their requirements, the successful future of systems development as being based upon OO (Object-Oriented) technologies delivering reusable components rather than by a process of <i>custom</i> development. Thus the major problems of computer-based information systems development - those common to any one-off development, be it a house, a motor car, whatever - namely defining what it must do, its essence, by means of complex and time-consuming processes of requirements engineering,
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Oh Yes There Is	The most significant problems which must be addressed have been shown to be those concerned with <i>knowing</i> what constitutes the <i>right</i> system. So the essential task is that of defining, capturing and validating the <i>system requirements</i> .
The Whole > Sum of its Parts	System thinking is a complex whole which includes emergent properties.
Emergence & Hierarchy	<ul style="list-style-type: none"> A system should be capable to changes in its environment. When we put these four - <i>emergence, hierarchy, communication</i> and <i>control</i> - together, we get the <i>image of the adaptive whole which may be able to survive in a changing environment</i>.
System-city Shifts	 <p>1950s, 1960s - PW is systemic M can be systematic</p> <p>1970s onwards - PW is ???? M can be systemic</p> <p>System thinking frames our ideas to structure a methodology as a model of the world. Hard systems engineering can then allow for problem decomposition into components, an objective which can be taken as given, and this desired end achieved / engineered by means of a systematic process. Soft systems thinking perceives the world as a set of connected purposeful activities (the <i>mess</i> mentioned in the previous lecture) which can be interpreted differently according to the different world views of the observer.</p>
Systemic Enquiry	It is still early days in the development and understanding of ways of applying the <i>soft</i> systems thinking approach. Although Soft Systems Methodology (SSM) had been around for over twenty years, it is still not widely employed.
Don't Ask Questions - Just Do It	Managers pride themselves on being task-oriented, action-focused, hard drivers who measure success in terms of deliverable time to market rather than <i>rightness</i> .
Commercial Reality	It is unrealistic to ignore aspects of <i>supplier push</i> in determining whether it will be possible to adopt a systems thinking approach in order to address the problems under discussion. # <i>How would you find the time and resource to think systemically.</i>

Lesson 4 - The State of the World

The aim of this lecture is to encourage you to relate to your local activity and longer term thinking to a broader perspective, exercising the unbounded systems thinking techniques covered in Lecture 3.

Globalization, or interconnectedness as Mitroff & Linstone call it, is becoming an increasing influence on business strategic planning activity, even at the level of small to medium sized organizations.

Why Is This Important?	<p>Firstly, it is vitally important that the IS discipline is not seen as separated from the business or organization in which it operates, but as a significant value-adding component of that business.</p> <p>Secondly, real-world issues contribute to the <i>messiness</i> of the problem situations into which IS will be implemented, and must be understood if the I.S is to be appropriate to its implemented environment.</p> <p>Thirdly, as will be demonstrated in the next lecture, good practice dictates that wide-ranging consequences analysis is included as a necessary component in risk management at all development life cycles stages.</p> <p>Lastly, the immaturity of the technology and its headlong rate of development mean that it is particularly vulnerable to external non-technical influences, and in planning future systems these influences must be taken into account to avoid blind-alley strategic choices.</p>
"Hard" Strategic Planning	The traditional approach to IS strategic planning is essentially through a <i>top-down</i> process, which starts with the highest level business objective or mission statement, from which the high-level overall strategic plan is derived. This gets decomposed at the next level down into functional plans.

	<p>Each of these will include a description of the system needs of that functional area. In turn, these requirements will further expanded to specify the software which is to be developed. Not only is this hard approach both practically and theoretically unsuitable for its purpose; it also runs a great risk of missing significant business opportunities.</p>
"Messy" Strategic Planning	<p><i>"The challenge is not to automate the past, but to invent the future."</i></p> <p>Strategic planning must be based, therefore, on enquiry (what <i>could be</i>), rather than data collection (what <i>is</i>.)</p> <p>Strategic planning must be based, therefore, on enquiry (what <i>could be</i>), rather than data collection (what <i>is</i>.)</p>
Aspects of the Mess	<p>You must identify <i>chains of possible consequence</i>, starting with changes in any of the following: political, economic, social, geographical, technological or the market sector and then <i>identify how these may affect the Information Systems</i> with which you, or your organization, are (or could be) concerned with.</p> <ol style="list-style-type: none"> 1. Political (For example, If the Northern Ireland Peace process fails: What will happen to the hardware manufacturing and software facilities in Ireland? or If there is significant reduction of Third World Debt, how will this open up new markets? What will the demand of these markets be? Will IS figure in these?) 2. Economic (For example, Will exchange rate instability prevents the tiger economies from moving into new technology markets? Who could replace them? What with? What infrastructure? Or how will globalization affect traditional industries and Investment? What could slow down this trend down?) 3. Social (For example, as the population ages, what will its technological needs be? Will these dominate the markets? Where will investment be targeted? What groups have the power to affect this? Or Is copyright enforceable, given the capacities of modern communication systems? Or Will censorship become a governing factor on Internet use in certain countries? Will the Internet meets its expectations or become unusable because of overloading by junk traffic?)

	<p>4. Geographical (For example, what drivers will increase the use of non-travel technologies for meetings, teleworking, etc.? or What if the earthquake happened in Silicon Valley? What if El Nino becomes more frequent? Or On what infrastructure would be increased use of IS depend - telecommunications facilities, access to consumables?)</p> <p>5. Technological (For example, new hardware [mobile computing devices], software [operating systems], etc.)</p> <p>6. Market Sector Specific (For example, Environmental threats to fossil fuel industries or 24-hour global banking access or software replacing labor-intensive hardware functionality in manufacturing).</p> <p># "We usually overestimate what we can do in two years and underestimate what we can do in ten."</p>
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Lesson 5 - Technological Conflicts - Risk & Consequence

In the previous lecture, we concentrated on the ways in which external events may have a significant influence on the future direction and possible application of Information Systems (IS).

In this lecture, we will look at the issue from the reverse direction –

How could Information Technology (IT) impact the world, either positively or negatively, and what issues does this raise?

Additionally, we must find a means by which the negative aspects of IS can be controlled and the positive aspects encouraged. This requires the extension of current risk management practice into areas of consequence in product operation.

Dilemma	Before we light the blue touch-paper of a new technology, we must assess its behavior and their possible consequences in every one of its potential operational states. In other words, we have to <i>change our way of thinking</i> in terms of the way Information Systems are developed.
Asimov's Three Laws of Robotics	A robot <ol style="list-style-type: none"> 1. May not injure a human being or through inaction allow a human being to come to harm. 2. Must obey orders from a human being provided those orders do not conflict with the first law. 3. Must protect it-self provided this does not conflict with either of the first two laws.
the 0th Law	In other words, we have to <i>change our way of thinking</i> in terms of the way Information Systems are developed.
the Hierarchy of Understanding	Therein is the major difficulty. As a result of the societal dependence on information technology, and the increasing interconnectedness of systems in daily use, we are already at the point where Information Systems have the potential to do severe damage. We cannot rely on them to operate safely if we have failed to change the way they are designed, incorporating some form of <i>ethical behavior</i> , based upon consequence analysis, in all operational states.
Risk Is...	<p>Risk ... is exposure to potential negative situations,</p> <p>Exposure to uncertainty</p> <p>a potential loss or bad event</p> <ul style="list-style-type: none"> • a threat to project success criteria • a threat to the wider operational environment <p>A composite value:</p> <ul style="list-style-type: none"> • Risk Exposure = Probability * Impact <p>In terms of risk of budget overrun, timescale overrun or lack of required quality characteristics. The argument central to this lecture is this must be extended <i>to include exposure to negative consequence in the wider environment.</i></p>
Operational States	<p>What is we did not understand the problem properly and specified the wrong thing?</p> <p>What if there is an undated fault in the software?</p> <p>What is another <i>interconnected</i> component of the external system fails - how will the <i>mess</i> o components behave then?</p> <p>An implemented system can operate in several states, first being the simple case <i>where it is doing exactly what it was asked to do</i>. Normal usage, in other words. However, it is also necessary <i>to consider operation when that usage is distorted and, possibly worse, the state when other aspects have not behaved as they should</i>, for instance:</p>
Problems of Use	
Problems of Abuse	

Problems of Failure	
Effect / Probability / Action Grid	
Attitudes to Disaster	
Consumer Protection Act	
Some Other Concerns	
Professional Ethics	

- Strategy: is a set of Business Management Approaches.
- **Strategy** is management's "**game plan**".
- the Strategy plan looks like Discovery Ship that goes in a trip and its aim in the end is to delight the humanity whom they able to contact where ever they are.
- A company's business model addresses "**How do we make money in this business?**"

Strategy Deals with a company's competitive initiatives and business approaches	Business Model Concerns whether the revenues and costs flowing from the strategy demonstrate that the business can be amply profitable and viable
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- **Why Are Strategies Needed?**

1. To **proactively** shape how a company's business will be conducted
2. To mold the independent actions and decisions of managers and employees into a **coordinated, company-wide** game plan

Good Strategy + Good Strategy Execution = Good Management

- **Missions vs. Strategic Visions** الرؤية والمهمة

1. A **mission** statement focuses on **current** business activities
"Who we are and what we do"
2. A **strategic vision** concerns a firm's **future** business path
"Where we are going"

- **Types of Objectives Required**

Financial Objectives

Outcomes focused on improving...**financial performance**

Strategic Objectives

Outcomes focused on improving...**long-term, competitive business position**

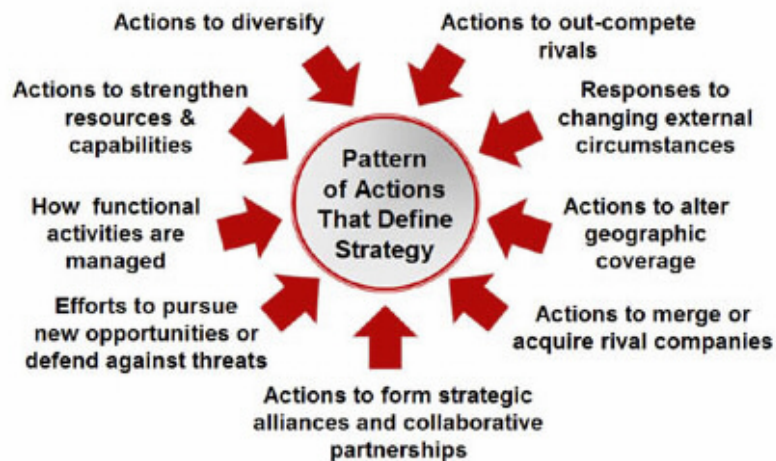
Task 3: Crafting a Strategy

- Strategy involves determining whether to
 - Concentrate on a **single business or several businesses** (diversification)
 - Cater to a broad range of customers or focus on a particular niche
 - Develop **a wide or narrow product** line
 - Pursue a competitive advantage based on
 - Low cost or
 - Product superiority or
 - Unique organizational capabilities
- Involves deciding how to
 - Respond to changing buyer preferences
 - Respond to new market conditions
- Grow the business over the long-term
- Achieve performance targets
- Outcompete rivals

The Hows That Define a Firm's Strategy

- How to grow the **business**
- How to please **customers**
- How to out compete rivals
- How to respond to changing market conditions
- How to manage each functional piece of the business and develop needed organizational capabilities
- How to achieve strategic and financial objectives

Understanding a Company's Strategy -- What to Look For ...



Crafting Strategy is an Exercise in Entrepreneurship

Strategy-making is a market-driven and customer-driven activity that involves:

- Keen eye for spotting emerging market opportunities
- Keen observation of customer needs
- Innovation and creativity
- Prudent risk-taking
- Strong sense of how to grow and strengthen business

What is a Strategic Plan ?



2

Three Elements of a Strategic Vision

1. Use the **mission statement** as a starting point
2. Develop a **strategic vision** that spells out a course to pursue
3. **Communicate** the vision in a **clear** and **exciting** manner

Characteristics of a Mission Statement

Defines **current** business activities

Highlights **boundaries** of current business

Conveys

Who we are,

What we do, and

Where we are now

Company **specific**, not generic — so as to give a company its own identity

A company's mission is not to make a profit!

The real mission is always - **"What will we do to make a profit?"**

Defining a Company's Business

A good **business definition** incorporates three factors...

Customer needs - **What** is being satisfied

Customer groups - **Who** is being satisfied

Technologies and competencies employed - **How** value is delivered to customers to satisfy their needs

Broad Definition

- Furniture
- Telecommunications
- Beverages
- Global mail delivery
- Travel & tourism

Narrow Definition

- Wrought-iron lawn furniture
- Long-distance telephone service
- Soft drinks
- Overnight package delivery
- Caribbean cruises

Two Types of Objectives Are Required

Financial Objectives

Outcomes that improve a firm's financial performance

Examples of Financial Objectives

- Achieve revenue growth of 10% /year
- Increase earnings by 15% annually
- Increase dividends / share by 5% /year
- Increase net profit margins from 2%-4%
- Attractive EVA performance
- Stronger bond and credit ratings
- A rising stock price (outperform S&P 500)
- Attractive increases in MVA
- Recognition as a "blue chip" company
- A more diversified revenue base

Strategic Objectives

Outcomes that strengthen a firm's competitiveness and long-term market position

Examples of Strategic Objectives

- A bigger market share
- Quicker design-to-market times than rivals
- Higher product quality than rivals
- Lower costs relative to key competitors
- Broader product line than rivals
- Better e-commerce and Internet sales capabilities than rivals
- Better customer service than rivals
- Recognition as a leader in technology
- Wider geographic coverage than rivals

Strategic Management Principle

Building a stronger long-term competitive position
benefits shareholders more lastingly than improving short-term profitability!

[GOTO TOP](#)

Concept of Strategic Intent

A company exhibits *strategic intent* when it *relentlessly* pursues an ambitious strategic objective and concentrates its competitive actions and energies on achieving that objective!

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Short-Range Versus Long-Range Objectives

Short-Range objectives...

- Targets to be achieved *soon*
- Serve as *stair steps* for reaching long-range performance

Long-Range objectives...

- Targets to be achieved within *3 to 5 years*
- Prompt actions *now* that will permit reaching targeted long-range performance *later*

Objectives Are Needed at All Levels

Objective-setting process is *top-down*, not *bottom-up* !

1. First, establish *organization-wide* objectives and performance targets
2. Next, set *business* and *product line* objectives
3. Then, establish *functional* and *departmental* objectives

Levels of Strategy-Making in a Diversified Company



Levels of Strategy-Making in a Single-Business Company



Corporate Strategy for a Diversified Company

3rd Direction-Setting Task: Crafting a Strategy

An organization's *strategy* deals with...



- How to make the strategic vision a reality and achieve target objectives
- The *game plan* for
 - Pleasing customers
 - Conducting operations
 - Building a sustainable competitive advantage

Strategy constitutes management's *business model* for producing good profitability

Identifying the Components of a Single-Business Company's Strategy



Strategic Management Principle

A company's strategy can't produce real market success unless it is **well-matched** to industry and competitive conditions!

Company Opportunities and Threats

For strategy to be successful, it has to

- Be well matched to capturing a company's best **opportunities**
- And help counteract **threats** to the company's well-being



Strategic Management Principle

To be a real **winner**, a **strategy** must ...

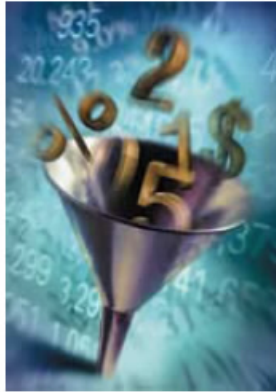
1. Fit the enterprise's internal and external situation
2. Build sustainable competitive advantage
3. Improve company performance

Company Situation Analysis: The Key Questions



- How well is firm's present strategy working?
- What are the firm's resource strengths and weaknesses and its external opportunities and threats?
- Are firm's prices and costs competitive?
- How strong is firm's competitive position relative to rivals?
- What strategic issues does firm face?

What is the Strategy?



- Identify competitive approach
 - Low-cost leadership
 - Differentiation
 - Focus on a particular market niche
- Determine competitive scope
 - Stages of industry's production/distribution chain
 - Geographic coverage
 - Customer base
- Identify functional strategies
- Examine recent strategic moves

Question 2: What Are the Firm's Strengths, Weaknesses, Opportunities and Threats ?

► **S** **W** **O** **T** represents the first letter in

➡ **S** trengths

➡ Weaknesses

➤ Opportunities

➡ Threats

Resource strengths and competitive capabilities are competitive assets !

Figure 4.1: Mobilizing Company Resources to Produce Competitive Advantage



Resource weaknesses and deficiencies are competitive liabilities !

Table 4.1: SWOT Analysis - What to Look For

Potential Resource Strengths	Potential Resource Weaknesses	Potential Company Opportunities	Potential External Threats
Powerful strategy Strong financial condition Strong brand name image/reputation Widely recognized market leader Proprietary technology Cost advantages Strong advertising Product innovation skills Good customer service Better product quality Alliances or JVs	No clear strategic direction Obsolete facilities Weak balance sheet; excess debt Higher overall costs than rivals Missing some key skills/competencies Subpar profits Internal operating problems . . . Falling behind in R&D Too narrow product line Weak marketing skills	Serving additional customer groups Expanding to new geographic areas Expanding product line Transferring skills to new products Vertical integration Take market share from rivals Acquisition of rivals Alliances or JVs to expand coverage Openings to exploit new technologies Openings to extend brand name/image	Entry of potent new competitors Loss of sales to substitutes Slowing market growth Adverse shifts in exchange rates & trade policies Costly new regulations Vulnerability to business cycle Growing leverage of customers or suppliers Reduced buyer needs for product Demographic changes

Strategic Management Principle

Successful strategists seek to capitalize on and leverage a company's resource strengths—its expertise, core competencies, and strongest competitive capabilities—**by molding the strategy around the resource strengths !**

A company's value chain consists of two types of activities :

- **Primary activities** (where most of the value for customers is created)
- **Support activities** that are undertaken to aid the individuals and groups engaged in doing the primary activities

Figure 4.2: Typical Company Value Chain



Figure 4.3: The Value Chain System for an Entire Industry



Example: Key Value Chain Activities

Pulp and Paper Industry	
	<ul style="list-style-type: none"> • Timber farming • Logging • Pulp mills • Papermaking • Printing & publishing
Home Appliance Industry	
	<ul style="list-style-type: none"> • Parts and components manufacture • Assembly • Wholesale distribution • Retail sales

Correcting **Supplier-Related Cost Disadvantages**: Options

- Negotiate more favorable prices with suppliers
- Work with suppliers to help them achieve lower costs
- Use lower-priced substitute inputs
- Collaborate closely with suppliers to identify mutual cost-saving opportunities
- Integrate backwards
- Make up difference by initiating cost savings in other areas of value chain

Correcting **Forward Channel Cost Disadvantages**: Options

- Push for more favorable terms with distributors and other forward channel allies
- Work closely with forward channel allies and customers to identify win-win opportunities to reduce costs
- Change to a more economical distribution strategy
- Make up difference by initiating cost savings earlier in value chain

Correcting **Internal Cost Disadvantages**: Options

- Reengineer how the high-cost activities or business processes are performed
- Eliminate some cost-producing activities altogether by revamping value chain system
- Relocate high-cost activities to lower-cost geographic areas
- See if high-cost activities can be performed cheaper by outside vendors/suppliers
- Invest in cost-saving technology
- Simplify product design
- Make up difference by achieving savings in backward or forward portions of value chain system

[QUESTION 3 | GOTO TOP](#)

From Value Chain Analysis to Competitive Advantage

A company can create competitive advantage by managing its value chain to:

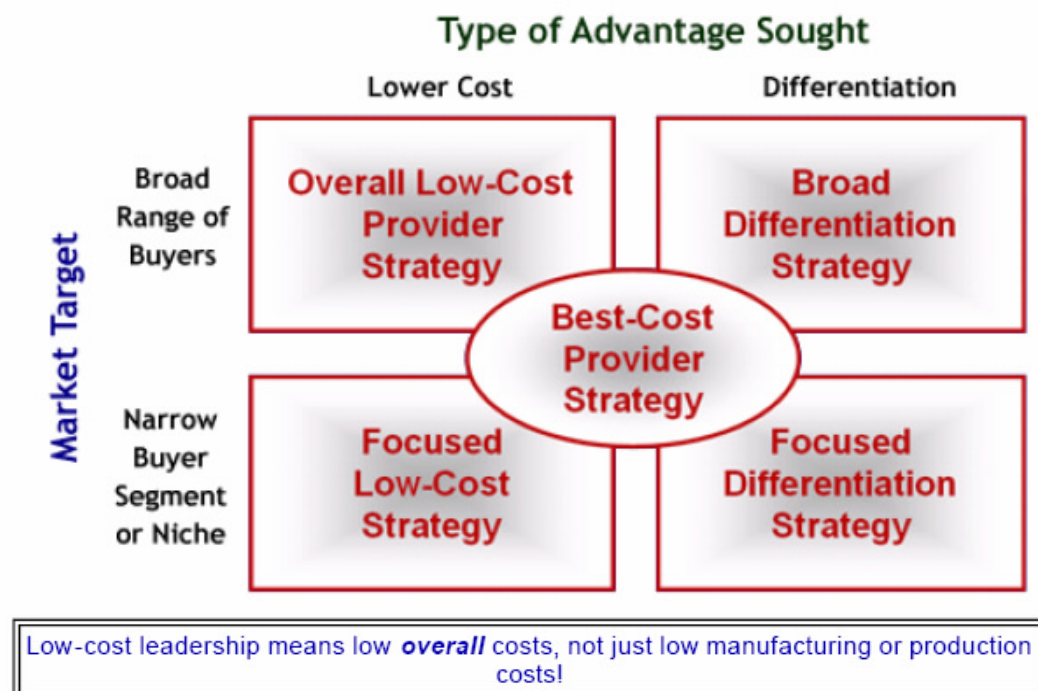
- ▶ **Integrate** knowledge and skills of employees in competitively valuable ways
- ▶ **Leverage** economies of learning / experience
- ▶ **Coordinate** related activities in ways that build valuable capabilities
- ▶ **Build dominating expertise** in a value chain activity critical to customer satisfaction or market success



What is “Competitive Strategy”?

- Consists of a company’s market initiatives and business approaches to
 - **Attract and please** customers
 - **Withstand** competitive pressures
 - **Strengthen** market position
- Includes offensive and defensive moves to
 - **Counter actions** of key rivals
 - **Shift resources** to improve long -term market position
 - **Respond** to prevailing market conditions
- **Narrower in scope** than business strategy

Figure 5.1: The Five Generic Competitive Strategies



Approaches to Securing a Cost Advantage

Approach 1: Do a better job than rivals of performing value chain activities efficiently and cost effectively

Approach 2: Revamp value chain to bypass cost-producing activities that add little value from the buyer's perspective



Competitive Strategy Principle

Strategic Business Analysis



Meeting the Challenge of High-Velocity Change



Source: Adapted from Shona L. Brown and Kathleen M. Eisenhardt, *Competing on the Edge: Strategy as Structured Chaos* (Boston, MA: Harvard Business School Press, 1998) p. 5.

Types of Strategic Fits

Cross-business **strategic fits** can exist anywhere along the value chain ...



- R&D and technology activities
- Supply chain activities
- Manufacturing activities
- Distribution activities
- Sales and marketing activities
- Managerial and administrative support activities

R&D and Technology Fits



- Offer potential for sharing common technology or transferring technological know-how
- Potential benefits ...
 - Cost-savings in technology development and new product R&D
 - Shorter times in getting new products to market
 - Interdependence between resulting products leads to increased sales

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Supply Chain Fits



Offer potential opportunities for skills transfer ...

- Procuring materials
- Greater bargaining power in negotiating with common suppliers
- Benefits of added collaboration with common supply chain partners
- Added leverage with shippers in securing volume discounts on incoming parts

[GOTO TOP](#)

Manufacturing Fits

- Potential source of competitive advantage when a diversifier's expertise can be beneficially transferred to another business ...
 - Quality manufacture
 - Cost-efficient production methods
 - Just-in-time inventory practices
 - Training and motivating workers
- Cost-saving opportunities arise from ability to perform manufacturing/assembly



- activities jointly in same facility, making it feasible to ...
- Consolidate production into fewer plants
 - Significantly reduce overall manufacturing costs

[GOTO TOP](#)

Distribution Fits



- Offer potential cost-saving opportunities ...
 - Share same distribution facilities
 - Use many of the same wholesale distributors and retail dealers to access customers

[GOTO TOP](#)

Sales and Marketing Fits: Types of Potential Benefits



- Reduction in sales costs ...
 - Single sales force for related products
 - Advertising related products together
 - Combined after-sale service and repair work
 - Joint delivery and shipping
 - Joint order processing and billing
 - Joint promotion tie-ins
- Similar sales and marketing approaches provide opportunities to transfer selling, merchandising, and advertising/promotional skills
- Transfer of a strong company's brand name and reputation

[GOTO TOP](#)

Managerial and Administrative Support Fits



- Emerge when different business units require comparable types of ...
 - Entrepreneurial know-how
 - Administrative know-how
 - Operating know-how
- Different businesses often entail same types of administrative support facilities ...
 - Customer data network
 - Billing and customer accounting systems
 - Customer service infrastructure

[GOTO TOP](#)

Organizational Structures of the Future: Requirements for Success



- Decentralized structures with fewer managers
- Small-scale business units
- Reengineering to decrease fragmentation
- Development of stronger and newer capabilities
- Collaborative partnerships with outsiders
- Empowerment and self-directed work teams
- Lean staffing of corporate support functions
- Electronic information systems
- Accountability for results
- Use of e-commerce in daily operations

[GOTO TOP](#)

Characteristics of Organizations of the Future

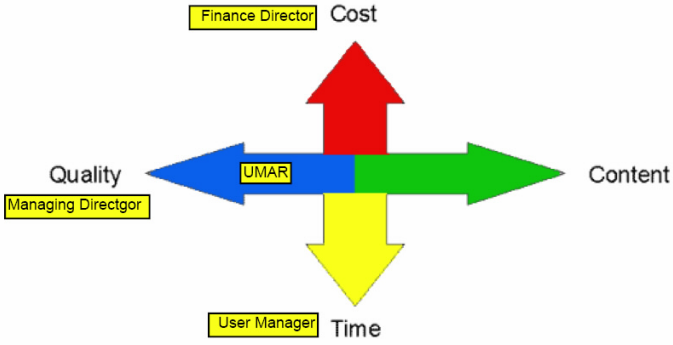
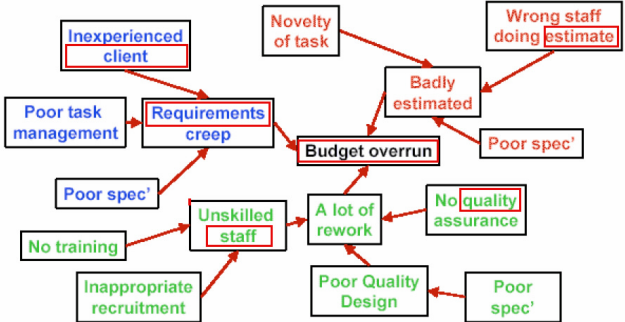


- Fewer boundaries between ...
 - Different vertical ranks
 - Functions and disciplines
 - Units in different geographic locations
 - Firm and its suppliers, distributors, strategic allies, and customers
- Capacity for change and learning
- Collaborative efforts among people in different functions and geographic locations
- Extensive use of e-commerce technology and Internet business practices

[GOTO TOP](#)

Lesson 1 - Introduction to Task Management

Task	A work required to be done.				
Management	Techniques of managing.				
Task Management	<p>Group of Task Management which requires Management Skills To manage. [CAT321]</p> <p>Skills Needed Creative Skills Analysis Skills Attention to detail Technical Knowledge Careful building or combining skills Communication Skills</p> <div style="display: flex; justify-content: space-between;"> <div> <p>Just to clarify the terminology heirarchy:</p> <table border="1"> <thead> <tr> <th>Program</th> <th>Project</th> </tr> </thead> <tbody> <tr> <td>Rarely has start & end date</td> <td> 1. Has start date & end date 2. Fixed budget 3. Target Deliverable (product or Service) </td> </tr> </tbody> </table> </div> </div>	Program	Project	Rarely has start & end date	1. Has start date & end date 2. Fixed budget 3. Target Deliverable (product or Service)
Program	Project				
Rarely has start & end date	1. Has start date & end date 2. Fixed budget 3. Target Deliverable (product or Service)				
Typical IS Related Tasks	<p>What are the tasks typically undertaken by individuals in an IS environment?</p> <p>What are the tasks typically undertaken by individuals who interact with an IS environment?</p>				
The Task Envelope	<p>Cost</p> <p>Time</p> <p>Quality</p> <p>Content</p>				
Why Tasks Fail	<ol style="list-style-type: none"> Undefined deliverable. Faults Un -independent Activity 				
What Are the Major Problems?	<p>Poor requirements capture</p> <p>operational environments unconsidered</p> <p>uncontrolled changes</p> <p>Unknown risks</p> <p>Estimation</p> <p>External constraints</p> <p>Inappropriate testing</p> <p>Inappropriate process</p>				
Critical Attributes	<ul style="list-style-type: none"> To avoid problems, an adequate product definition is needed with the critical attributes identified. This information will also form the basis of estimating the cost of undertaking the task. A great danger is where cost and time limits are precise and task content and quality is not. 				

	<ul style="list-style-type: none"> A precise documented picture of the task and what is to be delivered covering all the above dimensions is the only way to avoid these petals. 
Budget	<p>All the causes and effects that could lead to a Budget Overrun.</p> 
Content	<p>Does the information system do what it needs to? Completely? Correctly?</p> <p>What could cause the answer of this question to be "NO"?</p>
Quality	<p>Does the system meet its non-functional requirements? Usability Maintainability Availability Reliability</p>
Quality Specification	<p>the appropriate development approach, and be able to monitor the task in hand Identify distinct product components Specify critical characteristics and criteria Select development approach Map characteristics to metrics Use metrics to monitor quality</p>
External Quality	<p>How good is the product Does it meet users needs Measured and assessed at the end</p>
Internal Quality	<p>How good is the engineering How good are the components Can be measured as we develop</p>
How can we do it better?	<p>Some of the key principles therefore to improve the success rate of tasks and projects are to ensure that: the management of the task is improved; appropriate processes are applied, to achieve the required quality levels;</p>

<p>People are more effectively utilized and managed. This people dimension is believed to be of such significance, that this is the reason why a major element of this module on Task Management covers the <i>people issues</i>, with respect to communication and behavior related skills</p>

Lesson 2 - Task Initiation

Task Initiation

Task Initiation Checklist

More items that require consideration at initiation:

Who are the stakeholders, and what are their priorities, motivations and success criteria?

What real-world constraints apply?

What are the timescales and why?

What is the budget?

Are there any implementation constraints that affect the design process?

What skills and resources are needed?

What overheads must be included in the costing?

What is the history of the task?

Has anyone done anything similar before?

- Task Manager Must be appointed.

- Task Objectives

They must exist, and hopefully be consistent with corporate objectives. It should be possible to translate these into quantitative task success criteria.

- Task Title/Terminology

The importance of an appropriate title for a task should not be underestimated. A title with a positive association is more likely to engender enthusiasm amongst the team. Any terminology in the description of the task should be understood by all who are involved with the task.

- Technical Options/Risks

The options that are open to the task manager should be explored and documented, along with the associated risk of undertaking each option.

- Feasibility/Business Case

Is the task feasible? Where is the business case for undertaking the task? Who is the sponsor?

- Acquisition Strategy

Is it necessary to subcontract any of the tasks? If so, how should that be approached?

- Termination Options

Who has the authority to terminate the task, and under what conditions?

*

What are the structures that need to be in place before a new task can get underway?

Organizational Structure

Who are the team and what is their relationship with the rest of the organization? What is the reporting line?

Product Breakdown Structure

How does the task product breakdown, has any initial design work already been done as part of the feasibility study?

Work Breakdown Structure

How does the task breakdown into sub tasks to enable planning?

Chronological Structure

How do the work breakdown structure, and the product breakdown structure meet the delivery requirements of the client?

Cost Accounting Structure

How are the costs of the task to be monitored and accounted for?

Is it necessary to have a single bucket of budget for the entire task, or would it be more beneficial to allocate the budget across the sub tasks?

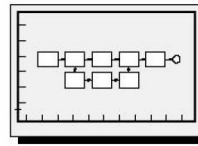
<p>Task Life Cycle</p>	<div> <pre> graph TD A[Obtain and agree task spec] --> B[Decide how to undertake task] B --> C[Undertake task] C --> D[Verify task undertaken correctly] D --> A D --> E[Demonstrate and Handover product of task] E --> A </pre> </div> <p>What is to be done? How is it to be done? Do it. Has it been done correctly or adequately? Demonstrate it to sponsor/user. Is it accepted? Hand it over - complete the task.</p>
<p>Resources Required</p>	<p>What Resources are Needed?</p> <ul style="list-style-type: none"> Time Money People Materials Equipment Information <p>Evaluate Alternatives</p> <p>Development Strategy - either incremental or <i>big bang</i>. Hardware Platform - networked PCs or dumb terminals on a server. Technical Methods and Tools: structured or object oriented methods? should tools be purchased or will tools currently in use in the organization suffice? Project Team Structure - flat or hierarchical? Resource Deployment - does every member of the team have a copy of each of the tools being used? Use of External Resources - is it necessary to recruit temporary contractors or subcontract part of the task?</p>
<p>Planning Cycle</p>	<div> <pre> graph TD subgraph Cycle Plan --> Estimate Estimate --> Review Review --> Communicate Communicate --> Plan end TS[Task specification] --> Plan T[Targets] --> Plan C[Constraints] --> Plan </pre> </div>

Planning Techniques

Bar charts



Activity networks/
PERT charts



Characteristic	Bar chart	PERT chart
Timing	Clearly shown	Not clear
Logic	No logic shown	Shows dependencies clearly
Familiarity	Easy to understand	Needs more explanation
Presentation	Can be scaled down to A4	Plans hard to read and do not scale down

Tool Parameters

The information that a tool will need in order to create a planning chart of the task:

1. Activities

work required plus waiting periods

realistic

What are the activities to be performed - are there any required delays or start time constraints on any of the activities?

2. Events

start finish

What events are needed - receipt of final specification or handover of product?

3. Relationships

What are the relationships (if any) between the various work items?

Outputs of Planning

three related but distinct deliverables:

A **Management Plan** includes the following information:

Validates the business case

Cost

Timescale

Organization

Resources

Risk

Including overheads e.g. reviews, meetings, documentation

A **Technical Plan** identifies:

Architectures

Products/deliverables

Dependencies

Alternatives/variables

Structured according to chosen life cycle model

The **Quality Plan** outlines the quality requirements, and the strategies that are to be employed to ensure that these quality requirements are met. Many of the techniques listed here are covered elsewhere in other sessions

of this module:

Quality criteria by stakeholder

Validation and verification strategy

Techniques and methodologies

Configuration management

	<p>Documentation standards and index Audit mechanism Post implementation review</p> <p>Planning Summary</p> <p>* To recap on planning: It is an iterative process that continues from the beginning of the task to its completion. It is recognizable in the real world team members can associate the plan with their work at all times. Even though it is expected to change, the overall structure of the plan should be robust. Local and organizational culture and experience should be embodied into the plan, and the life cycle and associated risks taken into consideration. Each of the management, technical and quality planning dimensions are covered either in a single document, or in three separate documents.</p>
Budgets	<p>Budgets must not be confused with estimates, and must always be treated as separate items, despite that the costs have to come out of the budget it must be remembered that one is a <i>target</i> and one is an <i>estimate</i>, and they should be managed accordingly.</p>
Estimates	<p><i>cost estimation</i> mean estimates of: staffing effort for production and/or maintenance, project duration, or staffing levels for a project.</p> <p>An Estimate is....</p> <ul style="list-style-type: none"> • An unbiased prediction <ul style="list-style-type: none"> ◦ most likely value ◦ qualified by upper and lower bounds • Understandable within the context of <ul style="list-style-type: none"> ◦ assumptions ◦ inherent risk ◦ estimation method • Transitory • An input to other processes <p>An Estimate is not...</p> <ul style="list-style-type: none"> • A target or constraint • A planning value • A single fixed value • A price • Fixed for eternity • An end in itself • Least possible value with non zero probability <p>Estimate Scope</p> <p>For effort this may be staff hours or staff days but it is important to ensure that any assumptions about how many hours there are in a day and/or how many days there are in a week are clearly understood. For duration, it is necessary to be clear whether days are calendar days, elapsed working days, or shifts. It is also important to be sure that it is clear what activities are included in the estimate. Is management time included? Is validation time and quality assurance effort included?</p> <p>Bounds</p> <p>There are factors other than profitability that can determine the price of a bid. However accurate assessment of profitability is important.</p>
Assumptions	<p>First you should state all the factors that were used to construct the estimate (these are your calculation assumptions and usually correspond to sizing measures - how big is the product expected to be?). You then need to consider other factors that might influence actual effort that were not used to construct the estimate. These are usually hidden in the underlying estimate assumption that the future will be similar to the past.</p>
Use of Estimates	<p>At different stages in the development cycle, estimates are: required for different reasons, based on different information, derived using different methods, have different degrees of accuracy.</p>

	<p>The estimation models must be based on locally collected data, and the estimation process must be suited to the requirements of your development process and management procedures.</p> <p>You need to establish procedures not just for making an estimate but also for putting realistic bounds on your estimate to indicate its accuracy and consider the risks associated with your estimate.</p>
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Lesson 3 - Task Monitoring, Control and Supporting Disciplines

Budget	<ul style="list-style-type: none"> • Slip timescale • Reduce content • Sacrifice quality
Timescale	<ul style="list-style-type: none"> • Reduce content • Sacrifice Quality • Increase Budget

1. Task Envelope - Monitoring and Control
2. Information Collation
3. Cost Monitoring
4. Earned Value Analysis
5. Techniques for Identifying
6. Potential Problems
7. Fault Rates
8. Slipping, Now What?
9. Action Pitfalls
10. Task Envelope - Supporting Disciplines
11. Fagan Inspection
12. Test Attitude
13. Quality Management System (QMS) & Audits Selection & Use of Tools

The Task Envelope

In this section we will concentrate on the definition of **success of a task**, and the difficulties of balancing Conflicting requirements from a variety of stakeholders.

We will look at the different **dimensions of success**:

IS Environment

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Cost

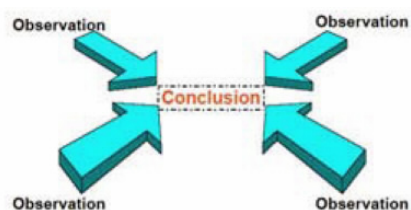
Time

Quality

Content

And in particular, the difficulties associated with specifying quality within an Information Systems environment.

Inductive – Consensual:



Derives a conclusion from a limited set of observations, which may be:

Analogous: for or example, the situation is a bit simpler than this one, but a little more complicated than that one

Historical: for example, in the past, the answer has always been such-and-such, within these tolerances

Multiple independently sourced: for example, an average derived from a group of experts

*** The conclusion is likely to be: *a single number, a fixed strategy, or a single course of action.*

Analytic - Deductive:



The Analytic - Deductive process share many difficulties with the inductive-consensual process.

In particular, there is a belief that there is always one single answer - a *number* or a *truth* - which can always be found if only we look hard enough.

- What question *are* we asking?
- What question *should* we be asking?
- When you discover the weaknesses of this approach, try to understand - **emergence** (that the problem *whole* will inevitably be greater than the sum of its parts due to *messiness*, the interaction between its components).

Task Control

Outputs of Planning	<p>three related but distinct deliverables:</p> <p>A Management Plan includes the following information:</p> <ul style="list-style-type: none"> Validates the business case Cost Timescale Organization Resources Risk Including overheads e.g. reviews, meetings, documentation <p>A Technical Plan identifies:</p> <ul style="list-style-type: none"> Architectures Products/deliverables Dependencies Alternatives/variables Structured according to chosen life cycle model <p>The Quality Plan outlines the quality requirements, and the strategies that are to be employed to ensure that these quality requirements are met. Many of the techniques listed here are covered elsewhere in other sessions of this module:</p> <ul style="list-style-type: none"> Quality criteria by stakeholder Validation and verification strategy Techniques and methodologies Configuration management Documentation standards and index Audit mechanism Post implementation review <p>Planning Summary</p> <p>* To recap on planning:</p> <ul style="list-style-type: none"> It is an iterative process that continues from the beginning of the task to its completion. It is recognizable in the real world team members can associate the plan with their work at all times. Even though it is expected to change, the overall structure of the plan should be robust. Local and organizational culture and experience should be embodied into the plan, and the life cycle and associated risks taken into consideration. Each of the management, technical and quality planning dimensions are covered either in a single document, or in three separate documents.
Budget	<ul style="list-style-type: none"> Slip timescale Reduce content Sacrifice quality
Timescale	<ul style="list-style-type: none"> Reduce content Sacrifice Quality Increase Budget

Lesson 1 - The Nature of Information and Systems

What is a System ? | What is Information? | Hierarchy of Understanding | What is an Information System?
Messy Problems | A Harder Question

What is a System?

A system is a set of interrelated entities or elements designed or structured to achieve an implicit or explicit objective.

A system may be defined as an assembly of elements, parts or components which has been identified to be of interest or which may do something, the elements of which are connected in an organized way and are affected by being in the system, and are changed if they leave the system.

Source: Ashby (1959) & Ackoff (1971)

The significant point is to identify the concept of system as a vehicle which influences a target environment and which has multiple interacting components making up the whole system, this whole having emergent properties which only apply at the whole level.

Many of you must have heard this view expressed as:

the whole is greater than the sum of its parts

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What is Information?

Information is data that have been put into meaningful and useful context and communicated to the recipient who uses it to make decisions... data are processed through models to create information.

Source: Burch & Grudnitski (1989)

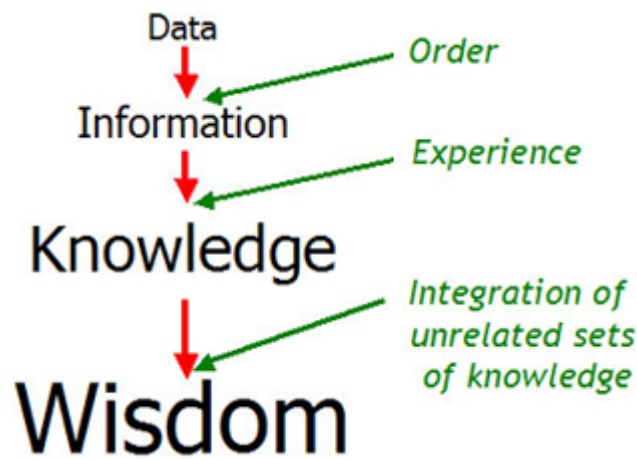
Data may be defined as any bit, from the dust in the air to the flecks in the carpet to the latest laundry list. Information.... is to be considered as data ordered to affect choice.

Source: Wildavsky (1983)

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A Hierarchy of Understanding

Can you make a clear distinction between **data**, **information**, **knowledge** and **wisdom** ?



The definition of **information** as **ordered data** is drawn out when you analyze the strengths, weaknesses and limitations of the current state of information systems.

But, it should be clear that concepts of **knowledge** and especially **wisdom**, are outside the capability of current technologies - despite claims to the contrary.

Discussion Question 1.1: Can you think of a situation in which computers have acted with gross stupidity? Post your answer to the Discussion Board.

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What is an Information System ?

An information system can be any organized combination of people, hardware, software, communications networks and data resources that collects, transforms and disseminates information in an organization.

Source: O'Brien 1975

There is no all-embracing **right** answer - but all answers should relate the concepts of **systems**, **emergence**, **ordering**, **informing**, **change** and **environment**.

Discussion Question 1.2: Post your definition of an Information System, in the Discussion Board.

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"Messy" Problems

Every human problem is associated and involved inextricably with every other human problem.

A "mess" is a system of interacting problems.

Source: Ackoff (1971)

Reading the above statements, one can conclude that there is a need for **softer** systems thinking.

Given the combination of emergent properties of systems applied to complex **messes**, it is unrealistic to expect that we will ever be able to define a problem rigorously enough for the **hard** approach to be usable.

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A Harder Question

"How can we know what we need ?"



this is the basic question which the course will attempt to answer, in the next lecture we will address the basic principles of enquiry.

Discussion Question 1.3: "How can we know what we need ?" Post your brief answer in the Discussion Board.

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Resources

Read: Fred Brooks, "**Essence and Accidents in Software Engineering**" (IEEE Computer, April 1987)

Optional Reading: R. K. Miles, "**Computer Systems Analysis: The Constraints of the Hard Systems Paradigm**" (Journal of Applied Systems Analysis, Vol. 11, 1985)

Optional Reading: J. Gaarder, "**Sophie's World**", London: Phoenix, 1995

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Lesson 2 - Principles of Enquiry

Enquiry | Enquiry Systems - I | The Learning Cycle | Enquiry System - II | Unbounded System Thinking
The Multiple Perspective Concept

The purpose of this lecture is to open your minds to the different ways in which issues can be viewed and investigated. It should encourage you to develop an approach in which you can explore your own unacknowledged assumptions and apply objective analysis in a problem situation.

Don't think of "a" single approach to enquiry, but accept that there are many other approaches of equal or greater validity.

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Enquiry

... The action of seeking for truth, knowledge or information concerning something; search, research, investigation, examination.

Source: OED

The first lecture ended with the question:

How can we know what we need ?

The Information Systems field is no different to most other areas of production activity in this; unless the question is answered correctly, no subsequent activity will be worthwhile.

Unless we truly know what we need, we will be unable to provide it, no matter how sophisticated our development methods are or how good the technologies we use are. We would simply be producing the wrong thing, and it would not matter how well we produced it - it would be useless.

We derive the necessary knowledge by means of enquiry.

If we accept the above as a reasonable definition of enquiry, so an ...

Enquiry System (ES) is a system for producing this knowledge.

Note: You may come across the abbreviation IS which is the American abbreviation for the same thing, i.e. Inquiry System. ES is far less confusing !

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Enquiry System - I

How do we learn ?



How do you learn ? To assist you...

Download and Complete the Activity: Preferred Learning Styles Self-Test before the Chat Session.

Are you ...

- a Pragmatist
- a Theorist
- a Reflector
- a Activist



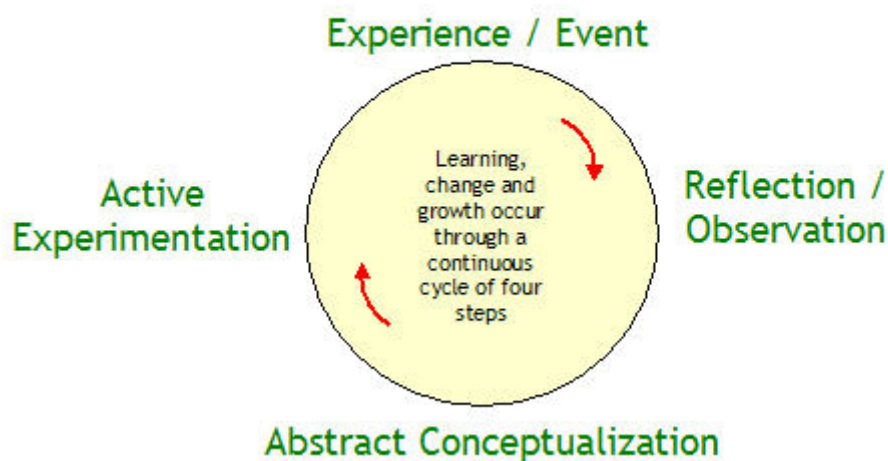
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The Learning Cycle

David Kolb suggests that *learning*, *change* and *growth* occur through a continuous cycle of four steps (Experience, Reflective/Observation, Abstract Conceptualization and Active Experimentation)

The first step in the cycle would be an *event or experience*, which is then *reflected upon*, possibly in the light of other *observations*.

The Learning Cycle (Kolb)



Source: Experiential Learning, David Kolb

Analysis of these steps is intended to *formulate possible new ideas*, *potential changes* of the planning of the *collection of further experiences*.

This can apply at an organizational level as well as at the personal level.

What follows is concerned with a set of methods by which the learning cycle can be instantiated.

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Enquiry Systems - II

As discussed in "Unbounded Minds" (Mitroff & Linstone):

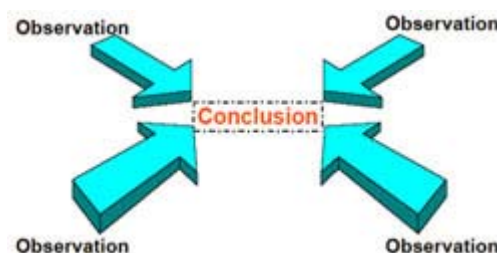
- Simple Systems
 - Inductive - Consensual
 - Analytic - Deductive
- Complex Systems
 - Dialectic
 - Multiple Realities
- Innovative Systems
 - Unbounded Systems Thinking



Inductive - Consensual Enquiry

... derives a conclusion from a limited set of observations, which may be:

- **analogous**
 - for example, the situation is a bit simpler than this one, but a little more complicated than that one
- **historical**
 - for example, in the past, the answer has always been such-and-such, within these tolerances
- **multiple independently sourced**
 - for example, an average derived from a group of experts



The conclusion is likely to be: a single number, a fixed strategy, or a single course of action.

Discussion Question 2.1: What are the weaknesses with this approach ? Post your answers on the Discussion Board.

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Analytic - Deductive Enquiry

The Analytic - Deductive process share many difficulties with the inductive-consensual process.

In particular, there is a belief that there is always one single answer - a number, or a truth - which can always be found if only we look hard enough.



They both share the fallacy that the definition of the problem itself is unproblematic, when in fact it is making this very definition:

- what question **are** we asking ?
- what question **should** we be asking ?

which is the heart of the problem itself.

Discussion Question 2.2: What are the weaknesses with this approach ? Post your answers on the Discussion Board.

When you discover the weaknesses of this approach, try to understand - **emergence** (that the problem *whole* will inevitably be greater than the sum of its parts due to *messiness*, the interaction between its components).

Initially you might find the criticisms of the two simple enquiry methods difficult to accept, after all the approaches used unquestioningly are used by most people.

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Dialectic Enquiry

From Socrates through the British system of parliamentary democracy to adversarial judicial enquiry in the courts, the dialectic has been a mode of enquiry which probes deeply into issues and acts as a practical decision making tool.

Rather than challenge the data, dialectic challenges the subjective assumptions, models and theories by which problems are defined and solutions postulated, and it is the debate itself that an objective solution, compromise or

synthesis will be reached.



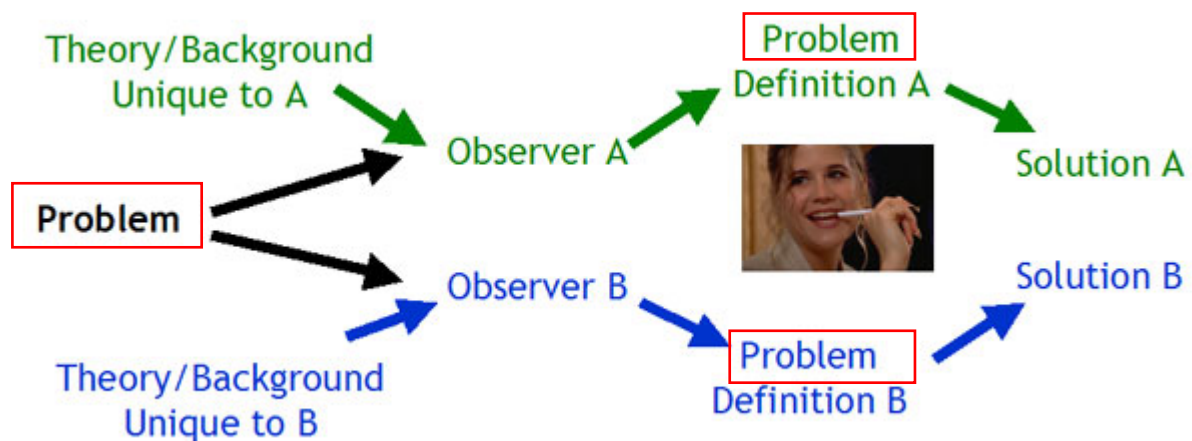
Chat Session: During the chat session you will be split into two groups, you will be asked to debate the issue of "the need (or not) for an independent, separate IS department in a business organization."

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Multiple Reality Enquiry

The key element in the multiple reality enquiry system is the understanding that the observer or analyst actively participates in the definition of the problem by placing the observed problem data against a theory or model which is personalized and unique to her/him and makes sense of the problem in these terms.

The observer and problem are not therefore, detached - but properties of the whole context problem domain.



The results of multiple reality enquiry is a range of representations of the problem and an equivalent range of solutions, which can be applied, synthesized or discarded.

The decision maker is informed on a board basis, and is thus better able to interpret the range of possible views and select a course of action. (Of course, this decision maker will also have her/his own unique theory and background and the decision will always be subjective to a certain extent.)

Concept of Risk in Enquiry

The two simple enquiry systems discussed previously appear to be *low risk*, in that they produce one single answer.

The complex enquiry system has the potential for multiple answers and therefore decisions based upon them seem more *risky*. Is this true ?

Discussion Question 2.3: Is this true ? Post your answer to the Discussion Board.

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Unbounded Systems Thinking

The need for systems thinking is grounded in the understanding of problems as *messes* - uncultivated and apparently *unrelated entities*, rather like patches of weeds and wild flowers - each affecting the other and resulting in a *whole* which is incapable of the rigid definition and identification required by the enquiry methods we have so far discussed.

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These *messes* give rise to *emergence* - attributes which are functions of the *whole*, but are not apparent at an individual component level.

Messy problems demand a creative approach to their solution; during the next lecture we will consider *systems thinking* in a much greater depth.



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The Multiple Perspective Concept

الإبداعي Innovative

The technical perspective refers to analysis and agreement - the logical aspects of a problem. In a sense this is the *single perspective* from which the earlier enquiry systems approached things.

The *multiple perspective concept* adds two other perspectives:

- The *social* or *organizational* perspective, which enquires from a structural viewpoint.
- The *personal* perspective, which takes the individual view.



Unless all perspectives are employed, the outcome will be, inevitably, unstable. To paraphrase (and extend) the book:

"technologies... fail to understand how T solutions to T problems become the O issues next time around, managers fail to understand how O solutions to O issues become P problems, and so on."

The need is to recognize *interconnectedness* in the systems with which we, as *information professional*, are concerned.

Therefore, we need to develop our enquiry abilities appropriately to the *whole* rather than just to the component, taking account of mess and understanding and enquiring upon emergent issues.

It is this which will form the base of the next lecture session.

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Lesson 3 - Systems Thinking

There's No Silver Bullet | Oh Yes There Is | Or Is There ? | The Whole is Greater Than the Sum of its Parts
Emergence & Hierarchy | Systemicity Shifts | Systemic Enquiry | Don't Ask Questions - Just Do It | Commercial Reality

الشامل

This lecture aims to place a rationale behind the need for new methods of enquiry and new approaches, particularly systems thinking and soft paradigms, to systems development.

خلاصة

الأمثلة

بصرامه

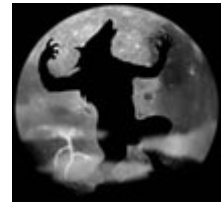
It is increasingly clear that hard engineering is rarely applicable to the type of systems which will be demanded in the future; the era of the bespoke system, rigorously specified to address a structured problem, is over. The commercial drivers clearly indicate a move towards an environment demanding increased component reusability: Information Systems (IS) development will, almost inevitably, become a process of assembly rather than creation from scratch. The soft paradigm which can support this is based on the systemic process of enquiry which this lecture will introduce.

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There's No Silver Bullet

استعار

The much quoted absence of a silver bullet in system development originated with Fred Brooks, who used the metaphor; *of a werewolf capable of changing, without warning, from something benign and familiar into a rapacious monster.*



The parallel he draws is that of the apparently inevitable propensity of software projects - which to a layman seem to have only a few simple tasks to be performed - repeatedly turning upon their customers and sponsors, biting deep into their throats, consistently failing to meet time, cost and quality targets and causing widespread damage.



اكتشف العلاج السحري المكافئ لأخطار بيئة هندسة البرنامج.

According to legend, werewolves can only be killed by silver bullets; the search continues to find the equivalent magical remedy for the perils of the software engineering environment.

حتميا فاشل، بسبب إلى خصائص البرنامج المتأصلة نفسه

Brooks suggests that this search is inevitably futile, due to the inherent properties of software itself - complexity, conformity, changeability and invisibility. He defines two types of tasks in software development:

- **essential tasks** - those which address the difficulty of building the abstract software entity, relating the functions it must perform and the data upon which it will perform them
- **accidental tasks** - which represent these abstractions in a form interpretable by available technological platforms

In a sense, this is a distinction between:

- **what the system must do** (which is platform independent), and
- **how it will do it** (which is platform specific)

To build the right system needs an understanding of what the right system - the essential system - actually is.

There is no short cut - no silver bullet - to gaining understanding.

All the advances made so far in software engineering have been directed at how things are done (the accidents) and these will never be able to address the problems surrounding the definition and capture of the essence of the system.

... Oh Yes There Is ...

Brad Cox, while complimenting Brooks' analysis of the issues, believes that the *magical silver bullet does in fact exist*, and that the problems around essence definition and capture can be alleviated by addressing not technological based accidents, but the culture which governs that way essence is defined in the first place.



The required culture change is that **customers** must be prepared to **define their needs in terms of what is available off-the-shelf** - perhaps having to compromise their **requirements**, rather than have systems built to meet every single whim and fancy.



Brad Cox sees the successful future of **systems development** as being based upon OO (Object-Oriented) technologies delivering **reusable components** rather than by a process of *custom* development.

Thus the **major problems** of **computer-based information systems development** - those common to any one-off development, be it a house, a motor car, whatever - namely defining what it must do, its essence, by means of **complex and time-consuming processes of requirements** engineering, would be eliminated in the same way as prefabricated components of standard dimensions and defined performance characteristics have been used to enable mass production of buildings and automobiles.

The werewolves of bespoke development would be defeated !

OO-based reusability, driven by purchaser pull and impatience with traditional approaches, would bring about the Software Industrial Revolution - or so Cox suggests.

Unfortunately, he places a little too much trust in technology, and as history has shown, the monster still lives !

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... Or Is There ? ...

The most significant problems which must be addressed have been shown to be those concerned with **knowing what constitutes the right system**.

So the essential task is that of **defining, capturing and validating the system requirements** - a composite set of abstractions which include the functions the system must perform in terms of transformations from *input* to *output*; the **data** which it will operate upon; the constraints such as the performance envelope within which it will have to operate (strictly speaking, the non-functional requirements).

Unfortunately, however, these difficulties are dwarfed by the enormous variety of interpretations of what constitutes *rightness*. *It is this variety which is the real werewolf.*

All those affected by the system - not just its **customers**, who are most likely to be business sponsors - but also its **users**, their own customers, and those in its wider operational **environment** can be said to have a stake in its success.

Each of these **stakeholders** will have a **unique perspective** within which this success will be defined, unique currencies in which they will measure the degree of success; and, perhaps most significantly, unique knowledge of the functional and non-functional requirements of that part of the operational system environment with which they are concerned.



There have been many systems which failed comprehensively - and publicly - because their developers did not capture and reflect an environmental aspect which was well known and understood by the system operators.

Chat Session: During the chat session, we will discuss the **London Ambulance Service** and the **London Stock Exchange Taurus System** case studies. [Click here to download the case studies and please read them before the](#)

The Whole Is Greater than the Sum of the Parts ...

If a new approach is to contribute to solving the problems around these issues, it must address this variety of interpretation of *rightness*, and provide a means by which the essential tasks of the system can be successfully performed. It must consider the whole, not just the most obvious components.

Systems thinking invites us to look at this whole.

"... the most basic core idea of **systems thinking..** (is) that a **complex whole** may have properties which refer to the whole and are meaningless in terms of the parts which make up the whole. These are the so called **emergent properties.**"

P. Checkland & J Scholes, "Soft Systems Methodology in Action", 1990

On its own, flour and water are *just* flour and water.



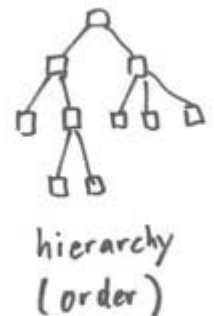
Together, they make a food called: *bread*.



Emergence and Hierarchy

The concept of *emergences* also implies a hierarchy, or series of component layers; from macro to subsystem to program through system to enterprise-level system combinations and so into the wide environment. Emergence can be seen at every single one of these levels, and each level displays emergent properties.

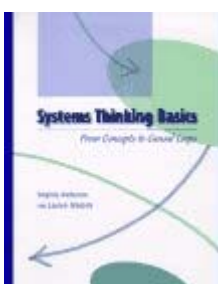
Additionally, a **system** has to be capable of responding to **changes in its environment**, and the means by which it achieves this is the cybernetic concept of **communication** - the transfer of information - and control, of the process by which the system retains its identity and/or performance under changing circumstances.



When we put these four - *emergence*, *hierarchy*, *communication* and *control* - together, we get the *image of the adaptive whole which may be able to survive in a changing environment*.

To make use of that image is to do systems thinking.

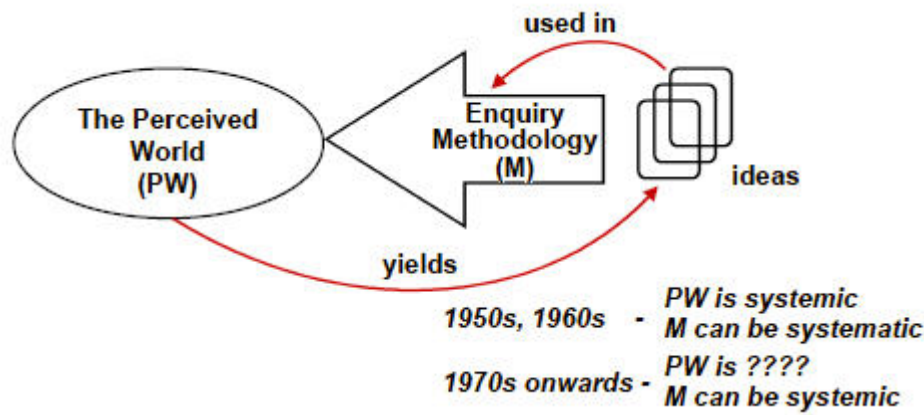
Systemicity Shifts



Systems thinking allows us to **frame our ideas** and use them to **structure a methodology** through which we can view the world and thus generate fresh ideas, using the idea of *system* as a **model of the world**.

In the past, the world was thought of as a single *whole*, with one unified purpose and one valid interpretation.

The distinguishing characteristic and creed in hard system thinking is that if S1 is the desired state, S0 the present state, then (S1-S0) defines the need.



Hard systems engineering can then allow for **problem** decomposition **into components**, an objective which can be taken as given, and this desired end achieved / engineered by means of a systematic process.

Soft systems thinking perceives the **world as a set of connected purposeful activities** (the *mess* mentioned in the previous lecture) which can be interpreted differently according to the different world views of the observer, and where the definition of a desirable end in a problem situation *cannot* be taken as given. The process of enquiry must thus be systematic in order to cater for this uncertainty.

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Systemic Enquiry

It is still early days in the development and understanding of ways of applying the *soft* systems thinking approach. Although Soft Systems Methodology (SSM) had been around for over twenty years, it is still not widely employed.

The ideas of Mitroff & Linstone (multiple perspectives / unbounded systems thinking), while self-evidently sound, are not embodied in any *industrial* development method and Multiview2 (Avison, Wood-Harper, Vidgen and Wood), an approach which synthesizes aspects of both the above and a number of well-accepted *harder* approaches, is not really past the theory stage.

We have to ask why this should be, when the arguments are clear and the history of IS is littered with systems which have failed to address *mess*.

Discussion Question 3.1: Why do you think this is ? Post your answer.

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Don't Ask Questions - Just Do It !

In the commercial environment with which we are mostly concerned, the prevailing culture is still by and large one in which managers pride themselves on **being task-oriented, action-focused, hard drivers who measure success in terms of deliverable time to market rather than *rightness***. They believe - an feel they must believe, as an article of faith - that there is always an answer which can be arrived at by *hard* approaches.



*"There **must** be a silver bullet -*

you are just not working hard enough to find it !!!"

The idea of **emergence, multiple perspectives and the SSM** philosophy of collaboration, learning, reflection and debate is alien to this culture - efficiency continues to rule over effectiveness.

When pressed, such managers have a tendency to dismiss as *Utopian* anything that prevents them **delivering the minimum possible in the shortest time at a maximized (short term) return**. It is difficult to imagine them discussing

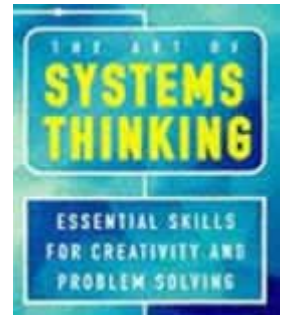
essence and *accident*, but harder still to suppose they would invest in a process which may discover the cause of the problem situation to be themselves and their attitudes.

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Commercial Reality

Additionally, it is unrealistic to ignore aspects of *supplier push* in determining whether it will be possible to adopt a systems thinking approach in order to address the problems under discussion.

As an example, the strategic battles in 1998 that was fought between Microsoft / Intel *client-server* architecture camp and the opposing *network computing* lobby may very well be about commercial battles for market share rather than *rightness* - but they still profoundly influence choices made by systems developers and their customers - their outcomes will shape the future.



The *whole* is unlikely to be their prime consideration, and the systems thinker will thus be forced to include such *shaping* organizations as extremely powerful actors and owners who have little or no intention of engaging in a learning process which may demand that they change their ways.

Discussion Question 3.2: How would you find the time and resource to think systemically and kill the werewolves once and for all. Post your answer.

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Lesson 4 - The State of the World

Why Is This Important? | "Hard" Strategic Planning | "Messy" Strategic Planning | Aspects of the Mess

The aim of this lecture is to encourage you to **relate to your local activity** and longer term thinking to a **broader perspective**, exercising the **unbounded systems thinking techniques** covered in Lecture 3.

Globalization, or interconnectedness as Mitroff & Linstone call it, is becoming an increasing **influence on business strategic planning activity**, even at the level of small to medium sized organizations

The issues covered in this lecture will be shaped by current events. However, the general principles derived will be common, whether the discussion centers on leadership struggles in America, a conflict in the Middle East, a financial crisis in the Pacific Rim or on European Monetary Union (EMU).

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Why Is This Important ?

Some people may be reluctant to consider the wider implications of Information Systems (IS) to the issues of the real world; they may feel that the role of Information Systems is merely to act as implementing technologies, leaving the wider issues up to others.



This is a naive view, which should be challenged immediately.

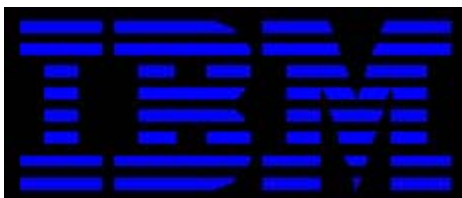
Discussion Question 4.1: Comment on a new Information System that has been implemented in a business, such as the airport, banking, ecommerce, etc. and how does it affect the organization, the users and its customers.

Firstly, it is vitally important that the IS discipline is not seen as separated from the business or organization in which it operates, but as a **significant value-adding component** of that business.

Secondly, **real-world issues contribute to the messiness** of the problem situations **into which IS will be implemented**, and must be understood if the IS is to be appropriate to its implemented environment.

Thirdly, as will be demonstrated in the next lecture, good practice dictates that **wide-ranging consequences analysis** is included as a **necessary component in risk management** at all **development life cycles** stages.

Lastly, the immaturity of the technology and its headlong rate of development mean that it is particularly vulnerable to external **non-technical influences**, and in planning **future systems** these influences must be taken into account to avoid blind-alley strategic choices.

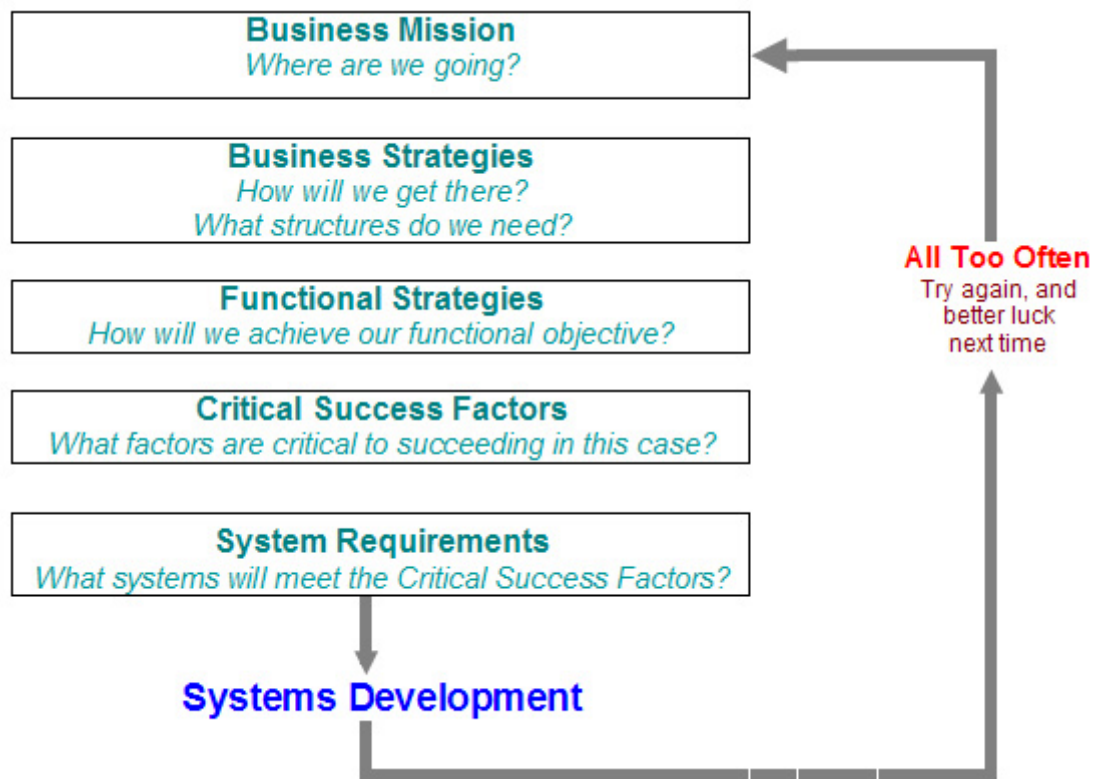


The choices made by IBM in the Personal Computer (PC) area – first outsourcing MS/DOS, then attempting to regain its market leadership position using the traditional IBM strong-arm tactics of the proprietary PS/2-OS/2 combination – were direct results of a **mainframe mentality** unable and/or unwilling to appreciate the abilities, desires, reluctance to be dictated to, and increased personal disposable income in a totally new market situation.

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"Hard" Strategic Planning

The traditional **approach to IS strategic planning** is essentially through a **top-down** process, which starts with the **highest level** business objective or mission statement, from which the high-level overall strategic plan is derived. This gets decomposed at the next level down into functional plans. **Each** of these will **include a description of the system** needs of that functional area. In turn, these requirements will further expanded to specify the software which is to be developed.



Although this is a very generic description, most current strategic planning methods work in much the same way. The flaw is that such approaches all assume a neat and tidy problem which can be solved by systematic means – and problem rarely, if ever, display such well-structured boundaries. The *mess* is the rule rather than the exception.



Not only is this **hard approach** both practically and theoretically unsuitable for its purpose; it also **runs a great risk of missing significant business opportunities**. It inevitably constrains the solution to include only technologies and external environmental issues which it believes it knows and understands, and fits them to the current business structures and processes. If technology was not changing so quickly, this would not be too severe a problem; but technology is changing at an unbelievable pace.

If we were operating in a stable, close environment the system requirements could be rigorously defined; but we do not. Effective strategic planning therefore *must* allow for taking maximum advantage of what the most up-to-date technology allows, in the light of prevailing and emerging environmental constraints.

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"Messy" Strategic Planning

Speaking in 1987, Michael Hammer, the Business Process Re-engineering (BPR) guru, said:

"The challenge is not to automate the past, but to invent the future."

Discussion Question 4.2: Post your reaction to this statement, in light of the apparent failure of the BPR approach to bring significant progress.

However the basic idea is still valid. Strategic planning will never be of any use if it attempts to address tomorrow's problems using yesterday's solutions; wide ranging change in the environment and massive technological progress need to be continually monitored, reviewed and assessed in order to respond to the opportunities and threats they present.

How can I take advantage of these?

What new technologies are available?
What new markets are opening?

What technologies are obsolescent?
What old markets are closing?

How can I best protect myself from these?

Strategic planning must be based, therefore,
on enquiry (what *could be*), rather than data collection (what *is*.)

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Aspects of the Mess

- Political
- Economic
- Social
- Geographical
- Technological
- Market Sector Specific



Under each of the above headings, there will be many factors which present opportunities and/or threats.

For the remainder of the lecture, we will be engaged in discussions so that you are given the opportunity to discover *interconnectedness*.

You must identify *chains of possible consequence*, starting with changes in any of the following: political, economic, social, geographical, technological or the market sector and then *identify how these may affect the Information Systems* with which you, or your organization, are (or could be) concerned with.

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Discussion Question 4.3: Political - Consider a political situation in your country or another country and identify how this may effect the Information System with which you, or your organization, are (or could be) concerned with. Post your answer.

(For example, If the Northern Ireland Peace process fails: What will happen to the *hardware manufacturing and software facilities* in Ireland? or If there is significant reduction of Third World Debt, how will this *open up new markets*? What will the *demand of these markets* be ? Will IS figure in these ?)

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Discussion Question 4.4: Economic - Consider an economic situation in your country or another country and identify how this may effect the Information System with which you, or your organization, are (or could be) concerned with. Post your answer.

(For example, Will exchange *rate instability* prevent the *tiger economies* from moving into *new technology markets* ? Who could *replace* them ? What with ? What *infrastructure* ? or How will globalization affect *traditional industries* and *investment* ? What could *slow down this trend down* ?)

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Discussion Question 4.5: Social - Consider a social situation in your country or another country and identify how this may effect the Information System with which you, or your organization, are (or could be) concerned with. Post your answer.

(For example, As the *population ages*, what will its *technological needs be* ? Will these *dominate the markets* ? Where

will investment be targeted? What groups have the power to affect this? or Is copyright enforceable, given the capacities of modern communication systems? or Will censorship become a governing factor on Internet use in certain countries? Will the Internet meet its expectations or become unusable because of overloading by junk traffic?)

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Discussion Question 4.6: Geographical - Consider a geographical situation in your country or another country and identify how this may effect the Information System with which you, or your organization, are (or could be) concerned with. Post your answer.

(For example, What drivers will increase the use of non-travel technologies for meetings, teleworking, etc.? or What if the earthquake happened in Silicon Valley? What if El Nino becomes more frequent? or On what infrastructure would be increased use of IS depend - telecommunications facilities, access to consumables?)

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Discussion Question 4.7: Technological- Consider a technological situation and identify how this may effect the Information System with which you, or your organization, are (or could be) concerned with. Post your answer.

(For example, New hardware [mobile computing devices], software [operating systems], etc.)

"We usually overestimate what we can do in two years and underestimate what we can do in ten."

Bill Gates, 1997

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Discussion Question 4.8: Market Sector Specific - Consider a market sector specific situation in your country or another country and identify how this may effect the Information System with which you, or your organization, are (or could be) concerned with. Post your answer.

(For example, Environmental threats to fossil fuel industries or 24-hour global banking access or software replacing labour-intensive hardware functionality in manufacturing)

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To continue in the field of Information Systems one must establish a **lifetime** habit of looking at current affairs with chains of consequences in mind.

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Lesson 5 - Technological Conflicts - Risk & Consequence

Dilemma | Asimov's Three Laws of Robotics | The 0th Law | The Hierarchy of Understanding | Risk Is... | Operational States
 Problems of Use | Problems of Abuse | Problems of Failure | Effect / Probability / Action Grid | Attitudes to Disaster
 Consumer Protection Act | Some Other Concerns | Professional Ethics

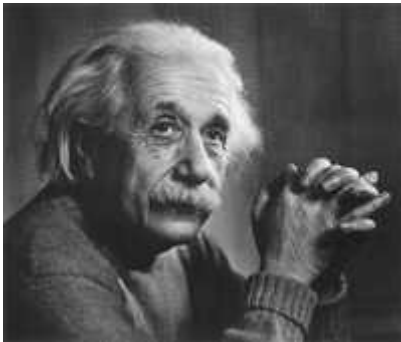
In the previous lecture, we concentrated on the ways in which external events may have a significant influence on the future direction and possible application of Information Systems (IS).

In this lecture, we will look at the issue from the reverse direction - **how could Information Technology (IT) impact the world, either positively or negatively, and what issues does this raise ?**

Additionally, we must find a means by which the negative aspects of IS can be controlled and the positive aspects encouraged. This requires the extension of current risk management practice into areas of consequence in product operation.

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The Dilemma



Pictures of Albert Einstein in later life show, through the expression in his eyes', the deep sadness of the man who said:

"The release of atom power has changed everything except our way of thinking if only I had known to what my research would lead, I would have become a watchmaker."

As information professionals, we too have a similar, shared responsibility.

Before we light the blue touch-paper of a new technology, we must assess its behaviour and their possible consequences in every one of its potential operational states. Then we must decide whether it would be better to abandon its use completely, or else address the cultural and behavioural aspects which could render it a curse rather than a blessing.

In other words, we have to *change our way of thinking* in terms of the way Information Systems are developed.

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Asimov's Three Laws of Robotics

Unless our way of thinking (the mechanisms we put in place to control the technologies we use) **keeps up-to-date** with the rate at which we develop these **technologies**, the consequences will be at best unpredictable and at worst potentially disastrous.

The theme of technology gone wrong is not new; many variations have been explored through centuries of art and literature. The stories of Frankenstein, 2001, Jurassic Park, even the Rocky Horror have entertained us using the same basic idea.



The science fiction writer, Isaac Asimov, to avoid his robot stories following the same plot, invented an appropriate way of thinking almost an ethical code.



His famous three laws of robotics are:

1. A robot may **not injure a human** being or through inaction allow a human being to come to harm.
2. A robot must **obey orders** from a human being provided those orders do not conflict with the first law.
3. A robot must **protect itself** provided this does not conflict with either of the first two laws.



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The 0th Law

The 0th Law

A robot **may not injure humanity** or through inaction allow humanity to come to harm.

Interestingly, after many good stories (which are essentially ethical/morality tales based on philosophical discussion of the three laws), he found it inevitable to postulate a fourth - or rather **zero-th**, as it precedes the other three in importance.

Even if one has not read these later stories, the distinction the author is making is clear. Ethics is not a cut and dried field what suits the greater good of humanity may be disadvantageous to an individual or to specific groups, and this **greater good** has primacy.

There is good sense in these laws. Perhaps science fiction will become fact, and **Asimov's laws will become the norm for the software based systems which will become robot generations of the future.** However, at this point in time, we are a long way off systems which could conceivably understand the subtleties and implications of such laws sufficiently to interpret them correctly.

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The Hierarchy of Understanding

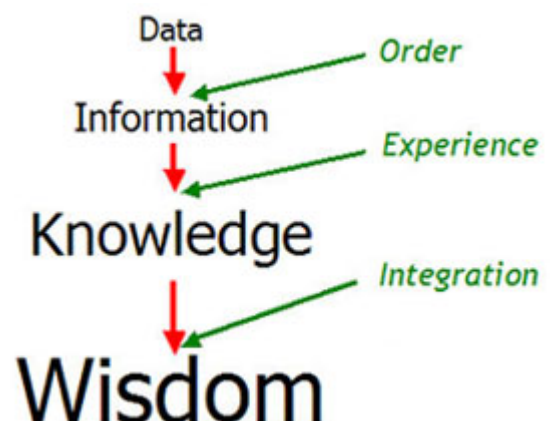
Therein is the major difficulty. As a result of **the societal dependence on information technology, and the increasing interconnectedness of systems in daily use**, we are already at the point where Information Systems have the potential to do severe damage. We cannot rely on them to operate safely if we have failed to change the way they are designed, incorporating some form of **ethical behaviour**, based upon consequence analysis, in all operational states.

We might well be in the **information age** - but information needs experience if it is to become **knowledge**, and knowledge needs the integration of many unrelated ideas if it is to become **wisdom**.

Even wise people make mistakes sometimes !

We have seen this hierarchy before in an earlier lecture. it is repeated here to illustrate **the current level of ability of technology to innovate and respond creatively and safely in a problem situation.** Even the most sophisticated currently available IS applications are firmly entrenched within the information level, and more than likely will continue to be so for significant length of time.

We cannot, therefore, assume that technology will be capable of making autonomous decisions and instigating independent action in response to unknown situations. Instead it is a design



responsibility to *anticipate* potential generic scenarios and *inbuild* appropriate safeguards.

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Risk Is...

- Exposure to **uncertainty**
- a potential loss or **bad event**
 - a threat to project **success criteria**
 - a threat to the wider **operational environment**
- A composite value:
 - **Risk Exposure = Probability * Impact**



This is not the point at which to discuss risk in depth. It is, however, important that you understand the **basic concept of risk ... as exposure to potential negative situations**, which should be thought of as a composite of the likelihood of an event occurring and the damage that event could cause. (Note: While it is also true that there is a sense in which risk can be positive - some business areas are based on risk, and manage it for profit - it still has the concept of uncertainty at its heart. Here, we are only talking about negative consequence, however.)

Currently, *risk management concentrates on taking action in those risk areas where the project itself is compromised* - in terms of **risk of budget overrun, timescale overrun or lack of required quality characteristics**. The argument central to this lecture is this must be extended to *include exposure to negative consequence in the wider environment*.

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Operational States

This is a lesson that is obviously too hard to learn, (judging by the number of times people are surprised by the turn of events) but things never turn out quite as we expected them to.

An implemented system can operate in several states, first being the simple case *where it is doing exactly what it was asked to do*. Normal usage, in other words. However, it is also necessary *to consider operation when that usage is distorted and, possibly worse, the state when other aspects have not behaved as they should*, for instance:



- What if we did **not understand the problem properly and specified the wrong thing** ?
- What if there is **an undated fault in the software** ?
- What is another **interconnected component of the external system fails** - how will the *mess* of components behave then ?

Discussion Question 5.1: Can you think of any "item" that started out as a "good" item and then it caused "different" problems ? Post your answer.

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Problems of Use

Chloro-Fluoro Carbons (CFC's) were originally seen as an environmental breakthrough - it didn't matter if they leaked; their inertness made sure that there could be no pollution risk.



Unfortunately, no-one enquired into the consequence of the release of large quantities of an inert gas upon the ozone layer.



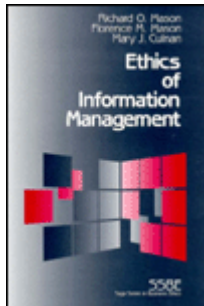
Tobacco was seen as a wonder drug, curing all known illnesses...

And now....



Both of these are examples of technologies which were **used exactly as specified**, but where the longer-term consequence of such use was not investigated.

The **social changes** brought about by information technologies may or **may not be beneficial in the long term**, but they are certainly inevitable - and rarely, if ever, considered in the design and implementation of those technologies.



Other stories can be found in:

Ethics of Information Management
Mason, Mason & Culnan, London: Sage (1995)

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Problems of Abuse

- **Nuclear** fission has a million and one uses for the benefit of humanity, but unfortunately it can have a **very negative use** as well.
- When we need to bring pain relief to those in agony, we use **diamorphine**; but the massive benefits it offers to the suffering are countered by the massive suffering it brings to those who abuse it - for diamorphine is in fact **heroin**.
- The **SABRE airline** booking system was manipulated in order to give preferential treatment to one airline.
- The benefits of the many positive uses of the **Internet** are countered by its **abuse** for pornographic purposes.
- **Electronic chipping of cars** (the replacement of the engine management software to deliver higher power from the engine) is becoming a major road safety problem as engines which have been chipped are used in vehicles with inadequate brakes, suspension and steering with resultant **loss of control**.
- The technology which is used for **electronic** tagging of offenders could also be used by totalitarian governments to suppress opposition by **restricting the free movement** of its opponents.
- **Hacking, viruses and computer crime** are additional areas where technology **abuse** causes major problems which could have been averted had time been spent on their identification, **consideration and prevention** at the design stage.



Sabre / **Airline Solutions**™

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Problems of Failure

The M25 **motorway around London** (England) was designed to cope with 60,000 vehicles a day, the level of traffic which was measured as crossing London without stopping. It currently carries a frustrated 200,000, **the designers not having understood or appreciated that the very presence of the road would generate more traffic**, like an *iatrogenic* illness which is actually caused by treatment for a lesser illness.



In less spectacular fashion, system failures every day are caused by the equivalent lack of understanding of the probable traffic patterns when the system is running in a live environment.

The year 2000 problem is a further classic example of **failure to understand the wider future consequence of designing** what seemed to be totally adequate systems.

A single character mis-type in a **software patch** in a telecommunications switch supplied by Digital Switch Corporation (DSC) in the United States (US) caused a major loss of a huge part of the US communications **network**, with accompanying distress and disruption to essential services.

There was not really much wrong at all with the software in the **London Ambulance system** which caused **9 hour delays in responding to emergencies**, or on the weapons systems which failed to prevent *scenario fulfillment on the Vincennes*.

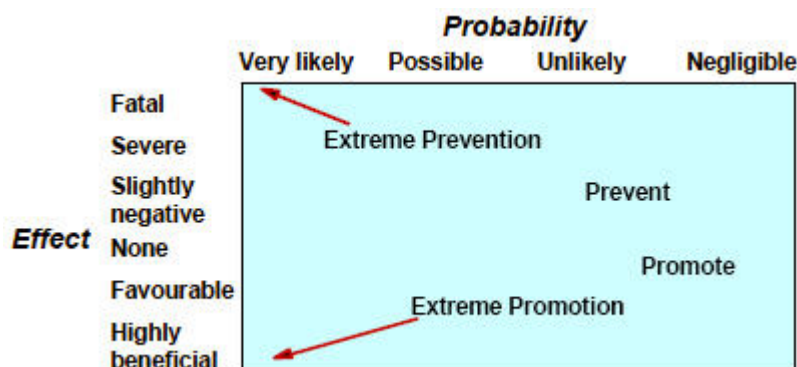
The common factor in both cases was that **the software was unable to cope with failure of design, failure of other components, failure to maintain an interface usable by people under extreme pressure**, and (perhaps most significantly) failure of those with a responsibility for general management to understand the real level of criticality of each system in its **target environment** and the need for the rigor of the development process to be appropriate to this.



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Effect / Probability / Action Grid - (by stakeholder)

If we are to change our **way of Information Systems development** to encompass the grid below, it will be necessary to include a process of consequence analysis as part of **best practice** in systems development.



As an example, the definition of such a practice might be (in the form commonly used in the US Software Engineering Institute's Capability Maturity Models for key process areas):

"To establish a process whereby the probability and severity of effects of use, abuse and systematic failure of the system component under development are assessed from the viewpoint of every stakeholder and that outstanding risks are management appropriately."

There are many approaches to consequence analysis, of which the grid above is just one example. The relationship of action to consequence and probability is something we are used to dealing with every day of our lives. Completing the grid is not that hard; but imposing the discipline of doing it as a mandatory part of normal hazard analysis might need some tenacity.



The issue is not the choice of analysis approach; but rather the **necessity for the analysis to be performed at an early stage to prevent negative consequences in the operational**

states of use, abuse and failure described above.

Once the potential **consequences** have been identified, **their management becomes feasible**. If they are not identified, managing them is impossible.

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Attitudes to Disaster

Read the following:

"The willingness or otherwise of senior, sponsoring business management to allocate resource to **performing a consequence analysis process**. This process may be both very time-consuming and expensive, only to **provide negative or inconclusive results**."

Discussion Question 5.2: What do you think about the above statement ? Post your thoughts.

However, writing in 1998, it appears that it might be that increased *ethical* processes are forced upon the systems development area as a business imperative.



Immanuel Kant offered the rule:

"Act only upon that maxim which you can at the same time will that it should become a universal law."

Writing today, he may have modified this for today's litigation-addicted society to read:

"Act only on that maxim which you can defend in a court of law."

From the dawn of time until a few years ago -
"Act of God"

From a few years ago to the foreseeable future -
"Who can I sue ?"

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Consumer Protection Act 1987

In the UK, it could be argued that the traditional defense in actions in product liability - **Act of God** - was replaced in 1987 by The **Consumer Protection Act**, at least as far as the legal system was concerned. (The majority of other countries either have, or are preparing, similar Consumer Protection legislation.)

Discussion Question 5.3: Does your country have a **Consumer Protection Act** ? when was it implemented ? Post your answer.

From that date, in the case of a product liability action, there is always someone to blame. Negligence does not have to be proven any more - all that needs to be shown is that damage was done, and that it was **the product that caused the damage**.

Consumer Protection Act 1987

- Unnecessary to show negligence
- Only requirements are:
 - the product was defective
 - the defect caused the damage

.... liability is ... imposed on the producer of the product (DTI guide to the act)



Even if the 1987 act is not invoked, negligence is still a potential basis for court action arising from problems with Information System products. **Negligence** may be established where a manufacturer or designer has failed to take sufficient care, which has led to failure resulting in injury. **The only defense is to prove that all reasonable care was taken.**

What this probably means is that **the trend towards adoption of best practice - including consequences analysis and attention to ethical design** - is not an unnecessary *luxury*, but a **necessary mechanism** without which defense against charges of negligence will be ten times harder - and against which it is increasingly unlikely that indemnity insurance will be available. (Or if it is, it will certainly be very expensive indeed.) The next few years will tell.

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Some Other Concerns

There are many other issues which could be discussed in this field, and which you should consider yourself.

Physical security of the product, in terms of both process and particularly data, may also be a consideration best addressed during the design process, perhaps once again forced upon developers by privacy or **data protection legislation**.



Intellectual property - ownership - of a product will become an increasingly difficult area as **more and more Information Systems are assembled from object libraries or via the Internet** - and these components, in turn, may be assembled from other components whose ownership is even more uncertain.



The **anti-trust** ruling against Microsoft in June 2000 is the most widely publicized anti-trust/monopoly case in recent years, the repercussions of which are yet to be seen.

Discussion Question 5.4: Find out what the ruling was and what has happened since the ruling. Post your answer.

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Professional Ethics

Finally, as Information Systems becomes recognized as a profession in its own right, the next few years will almost inevitably see the creation of some form of mandatory recognized qualification for its practitioners (again it may be forced by the pressures of **defending against liability litigation**), equivalent to those in architecture, surveying, accountancy and other similar disciplines.



Part of this will be compliance with a **professional code of conduct**, some likely models for which can be found in the appendix of Mason, Mason & Culnan book referred to earlier.

Discussion Question 5.5: Try to locate a professional code of conduct that Information System Developers use or could use. Post your answer.

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responsibility for a defined component part of the project with the associated component budget and time constraints and requirement to deliver a quality product.

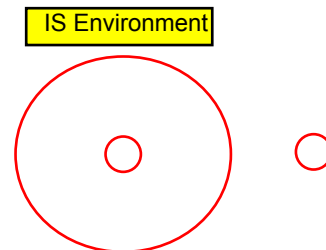
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Typical IS Related Tasks

- What are the tasks typically undertaken by individuals in an IS environment?
- What are the tasks typically undertaken by individuals who interact with an IS environment?

People oriented tasks

- Communicating
- Interviewing
- Team building
- Presenting
- Explaining
- Training



Task Allocation

Once you have identified an adequate list of tasks, the next question that arises is:

- Who does what?
- How do we allocate tasks?

What should we do if such an individual is not available?

Skills Needed

CAT
321

- Creative Skills
- Analysis Skills
- Attention to detail
- Technical Knowledge
- Careful building or combining skills
- Communication Skills

What other skills can you think of that would be needed to complete an IS team?

Can you think of any skills that are **not needed**?

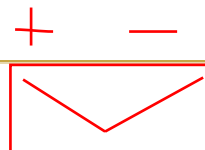
Many IS organizations find themselves with insufficient time to develop the new systems that the businesses need, because they are required to maintain a large number of poorly implemented systems that have been installed to meet deadlines, prior to the systems being fully tested.

This often leads to an organization entering a downward spiral of fire-fighting mode, where a constant stream of crisis caused by system failures or problems are the norm, from which it is extremely difficult to emerge.

Discussion Question 1.1: How would you prevent the need for a fire-fighting mode? Once in a fire-fighting mode, how would you get out of it?

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The Task Envelope



In this section we will concentrate on the definition of success of a task, and the difficulties of balancing conflicting requirements from a variety of stakeholders.

We will look at the different dimensions of success:

- Cost
- Time
- Quality
- Content

ICQ

Dimensions of Success

and in particular, the difficulties associated with specifying quality within an Information Systems environment.

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Why Tasks Fail

.Undefined **deliverable**
Faults
 Un-independent **Activity**

Success not defined

The most common reason for task to fail is that success was never defined in the first place, and for one reason or another, **the wrong product was made**, often entirely in the wrong way.

Faults

If by some stroke of luck, the right product was built, then there are often faults in the product caused either by **design errors** or by assumptions made by some party who had not paid due care to the documented specification.

Interface Problems

A task is **rarely a totally independent activity**, and it will depend upon other tasks being undertaken in parallel being performed by other teams - sometimes by other organizations. This can lead to interface problems, when the final product is combined with those of the other tasks.

What Are the Major Problems?

In an Information Systems environment the major problems encountered which lead to failed tasks and projects nearly all fall into these categories: **RETP**

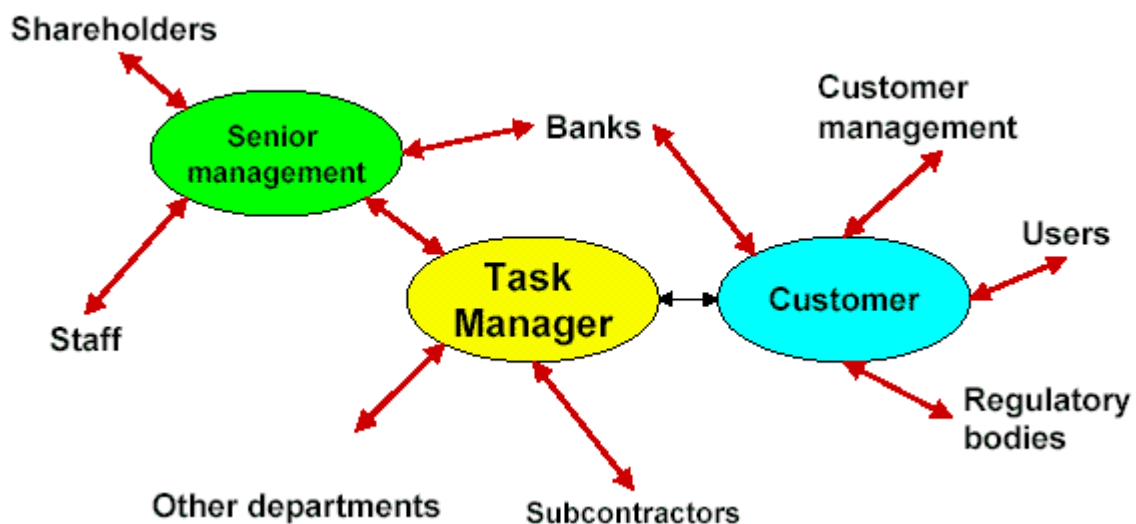
- Poor **requirements** capture
 - operational environments unconsidered
 - uncontrolled changes
- Unknown **risks**
- **Estimation**
 - Externarnal constraints
- Inappropriate **testing**
- Inappropriate **process**

Discussion Question 1.2: What is the effect of each of these problems? What could one do to counteract them?

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Stakeholders

The task stakeholders are individuals or organizations who have a vested interest in the environment, performance and/or outcome of the task. The task manager, his team and his client are not the only stakeholders in the task. The diagram below show other stakeholders that have an interest (financial or otherwise) in the task in hand.



By identifying stakeholders up front, we can determine their needs and expectations, and try to manage and influence those expectations to the betterment of the task.

Stakeholders should be formally consulted over the life cycle of the task.

Diverse Success Criteria

Success criteria is a definition in measurable terms of what must be done for the task to be acceptable to the client, stakeholders and end-users who will be affected by the task. Each of the stakeholders identified in the diagram above will have different success criterias.

Discussion Question 1.3: Can you identify the success criteria of a **task manager** and **customer** identified in the above diagram. Are there are any conflicts? If so what can be done to resolve them?

Defining Objectives

Alice said "Would you tell me, please, which way I ought to go from here?"

"That depends a good deal on where you want to get to," said the Cat.

"I don't know where. . ." said Alice.

"Then it doesn't matter which way you go," said the Cat.

Alice in Wonderland
by Lewis Carroll

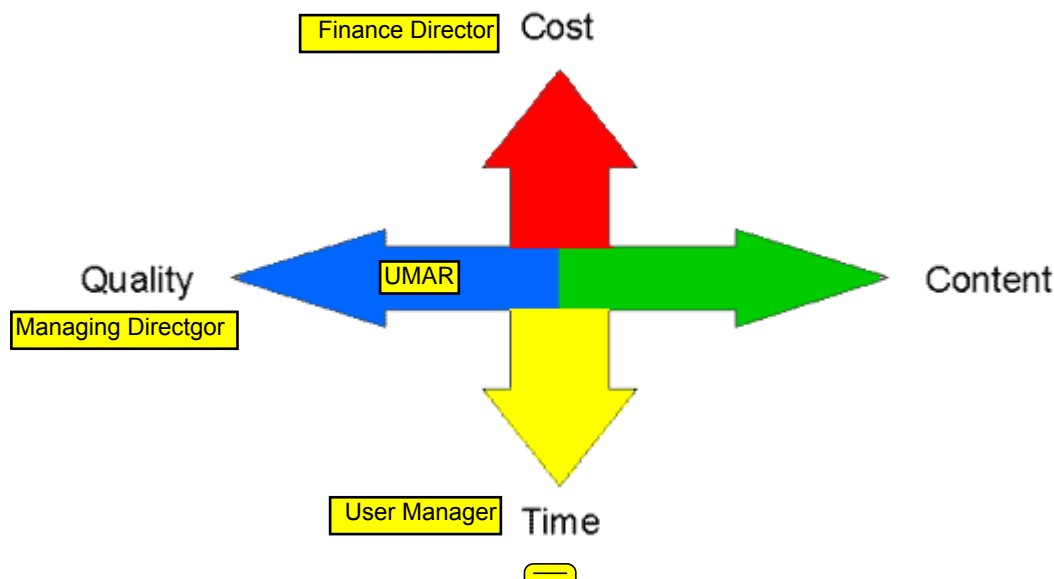
This quote from Lewis Carroll "Alice through the Looking Glass" , again emphasises the importance of defining objectives at the start of the task.

If clear objectives do not exist a task can go wrong in several ways, over achieving in one direction, and under achieving in other directions. To avoid these problems, an adequate product definition is needed with the **critical attributes** identified. This information will also form the basis of estimating the cost of undertaking the task.

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Critical Attributes

Critical Attributes are those which if not achieved mean that task or project is a failure. The diagram below show the four critical attributes that contribute to the success of any task - **Cost, Time, Quality and Content**



A great danger is where cost and time limits are precise and task content and quality is not. You may find that the scope of the project is growing, putting you under more and more pressure as the cost and time limits do not change. Often these limits come from different places - the finance director sets the cost target, the user manager sets the timescale target and the managing director sets the quality targets. You become a ping pong ball batted between all the parties, and only you can lose!!

A precise documented picture of the task and what is to be delivered covering all the above dimensions, is the only way to avoid these pitfalls. The challenge then becomes to obtain agreement between all the stakeholders on the documented parameters before work commences.

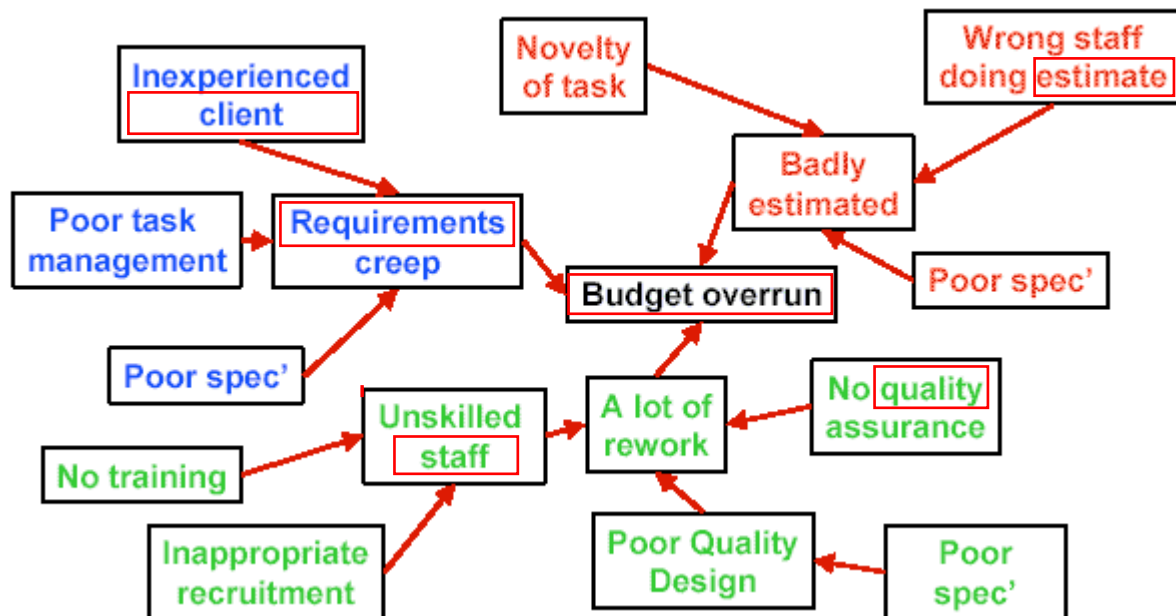
Once work has commenced against this agreed documented specification, then changes should only be allowed under very controlled circumstances.

Budget

Has the task met its budget targets?

What could cause the answer to this question to be "NO"?

The diagram below shows a mind-map to determine all the causes and effects that could lead to a Budget Overrun.



This is the beginning of a mind-map for budget overrun causes. It is simply drawn by brainstorming the possible causes of failure, and then further exploring what may lead to those causes occurring.

Already it can be seen that an obvious common cause for budget overrun is a poor specification of the task. If this also occurs on the other mind-maps, then it is significant indicator that something needs to be done about it. This can be achieved by exploring why poor specifications happen, and trying to put into place preventive measures before potential problem becomes a reality.

Timescale

Has the task met it's timescale targets?

What could cause the answer to this question to be "NO"?

Content

Does the information system do what it needs to?

- Completely?
- Correctly?

What could cause the answer of this question to be "NO"?

Quality **UMAR**

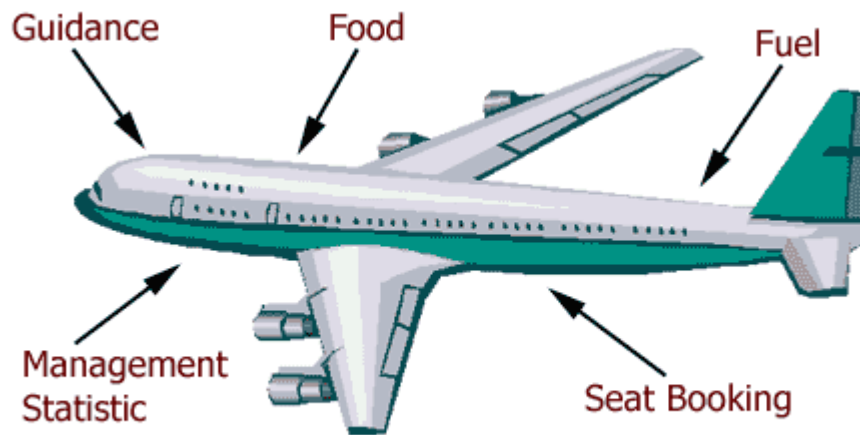
Does the system meet its **non-functional requirements?**

- Usability
- Maintainability
- Availability
- Reliability

What could cause the answer to this question to be "No"?

It is worth noting that quality is rarely a single entity, and first needs to be broken down into it's constituent parts. The reasons for failure to meet each of these non-functional or quality requirements ar likely to be very different, and it may be mroe appropriate to treat them seperately.

Diverse Needs



It should be noted that different parts of the overall system have different criteria for success, and it is often inappropriate to apply the same stringent criteria to all portions or components of the system.

For example, one would expect high usability criteria to be placed on the seat booking system, and high reliability criteria on the guidance and fuel systems. Each of these criteria, should, as far as possible be specified quantitatively.

Each of these non-functional requirements has different implications on the development of the system component and hence on the cost.

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Quality Specification

It is necessary to determine all the non-functional requirements to ensure the appropriate development approach, and be able to monitor the task in hand

- Identify distinct product components
- Specify critical characteristics and criteria
- Select development approach
- Map characteristics to metrics
- Use metrics to monitor quality

Product
Criteria
Development Approach
Map
Monitor

Internal and External Quality

It is also necessary to be aware that quality can be and needs to be specified and assessed from two main viewpoints, and these should not be confused. The external view is one which is often associated with users, and it is necessary to include all the external parameters in the specification of the product of the task.

- External Quality
 - How good is the product
 - Does it meet users needs
 - Measured and assessed at the end

User Needs
Product
Measure

The one problem with this view, is that these characteristics can only be assessed when the product is complete, and often already in use. This has led to the development of the internal view of quality as described below.

- Internal Quality
 - How good is the engineering
 - How good are the components
 - Can be measured as we develop

There are techniques that can be applied to assess the quality according to this view during development, and hence before the users have the opportunity to complain.

It should be noted, however, that although significant research has been and is being undertaken on the relationship between the internal and external quality, there is no proven relationship which will guarantee that if you have good internal quality then you will also have good external quality.

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How can we do it better?

Some of the **key** principles therefore **to improve the success rate of tasks and projects** are to ensure that:

- the **management of the task is improved;**
- **appropriate processes** are applied, to achieve the required quality levels;
- **people** are more effectively utilized and managed. This people dimension is believed to be of such significance, that this is the reason why **a major element of this module on Task Management covers the people issues,** with respect to communication and behaviour related skills

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Links

[Project Management Glossary](#)

Task Management

Lesson 2 - Task Initiation

Task Initiation | Task Life Cycle | Resources Required | Planning Cycle | Planning Techniques | Outputs of Planning
Budgets | Estimates | Assumptions | Use of Estimates

Task Envelope - Task Initiation

In this lesson we will discuss some of the considerations that are needed to made when a **new task is initiated**.

We will look at:

- the life cycle of the task;
- the importance of planning, and how one might use a software tool to assist in the planning process;
- the principles of cost estimation we explore some of the problems associated with software cost estimation and how they can be overcome;
- what we mean by an *estimate* and the type of information that needs to accompany an estimate.

Take a few mintues to brainstorm some ideas of what needs to be addressed whenever a new task is initiated.

Try to develop your own checklist that can used, updated and reused for every task that you may encounter.

Task Initiation Checklist

Task Manager	Must be appointed.
Task Objectives	They must exist, and hopefully be consistent with corporate objectives. It should be possible to translate these into quantitative task success criteria.
Task Title/Terminology	The importance of an appropriate title for a task should not be underestimated. A title with a positive association is more likely to engender enthusiasm amongst the team. Any terminology in the description of the task should be understood by all who are involved with the task.
Technical Options/Risks	The options that are open to the task manager should be explored and documented, along with the associated risk of undertaking each option.
Feasibility/Business Case	Is the task feasible? Where is the business case for undertaking the task? Who is the sponsor?
Acquisition Strategy	Is it necessary to subcontract any of the task? If so, how should that be approached?
Termination Options	Who has the authority to terminate the task, and under what conditions?

More items that require consideration at initiation:

- Who are the stakeholders, and what are their priorities, motivations and success criteria?
- What real-world constraints apply?
 - What are the timescales and why?
 - What is the budget?
 - Are there any implementation constraints that affect the design process?
- What skills and resources are needed?
- What overheads must be included in the costing ?
- What is the history of the task?
 - Has anyone done anything similar before?

- What is the history of the team that has been allocated'?

Take a few minutes to think over the answers to these questions.

Project Structures

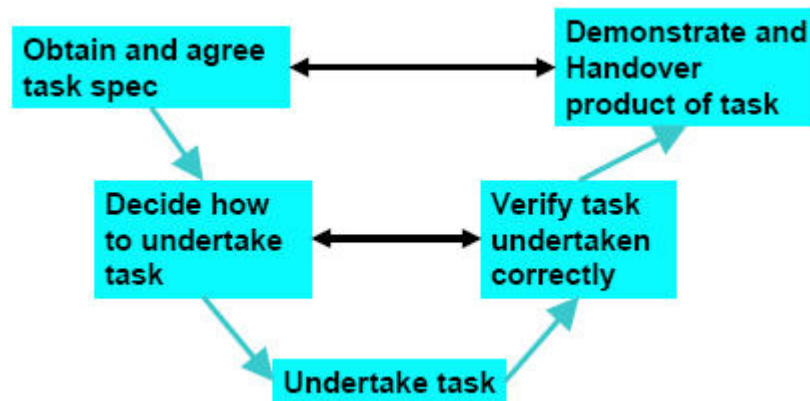
What are the structures that need to be in place before a new task can get underway?

- Organisational Structure
 - Who are the team, and what is their relationship with the rest of the organisation? What is the reporting line?
- Product Breakdown Structure
 - How does the task product breakdown, has any initial design work already been done as part of the feasibility study?
- Work Breakdown Structure
 - How does the task breakdown into sub tasks to enable planning?
- Chronological Structure
 - How do the work breakdown structure, and the product breakdown structure meet the delivery requirements of the client'?
- Cost Accounting Structure
 - How are the costs of the task to be monitored and accounted for? Is it necessary to have a single bucket of budget for the entire task, or would it be more beneficial to allocate the budget across the sub tasks?



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Task Life Cycle



This visual illustrates that whatever the task in hand, a structured approach to the task can assist in the planning and estimation processes. This is drawn at a very high level, and consists basically of:

- What is to be done?
- How is it to be done?
- Do it.
- Has it been done correctly or adequately?
- Demonstrate it to sponsor/user.
- Is it accepted?
- Hand it over - complete the task.

The significance of the black arrows is to show the relationship between the input and outputs.

Discussion Questions 2.1: Do you agree with this structure? How, if at all, would you amend it? There is no

right answer here, but it is important to ensure that the process is thought about before embarking on the task in hand, and drawing the process in the form of a life cycle, can assist in this planning process. Post your answers on the Discussion Board.

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Resources Required TIME P

What Resources are Needed?

- Time
- Money
- People
- Materials
- Equipment
- Information

Can you think of anything else ? if you are planning an Information System related task.

Take a few minutes to think of anything else.

Evaluate Alternatives

The following is a list of alternatives, that require evaluation prior to embarking on an Information System related task:

- **Development Strategy** - either incremental or *big bang*.
- **Hardware Platform** - networked PCs or dumb terminals on a server.
- **Technical Methods and Tools:**
 - structured or object oriented methods?
 - should tools be purchased or will tools currently in use in the organisation suffice?
- **Project Team Structure** - flat or hierarchical?
- **Resource Deployment** - does every member of the team have a copy of each of the tools being used?
- **Use of External Resources** - is it necessary to recruit temporary contractors or subcontract part of the task?

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The Planning Cycle



Once the initial information collection has been completed, and planning cycle can begin.

It should be emphasised, that planning is not only undertaken at the outset of the task, but plans should be continually reviewed and re-estimated throughout the task.

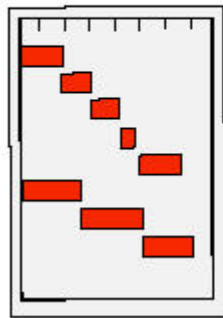
The frequency of each cycle depends on the criticality and complexity of the task itself, but during the initial phase it may appear to be a constant activity.

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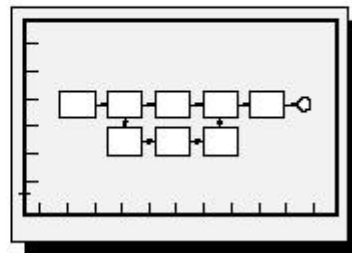
Planning Techniques

Several well recognised and documented techniques exist for planning.

Bar charts



Activity networks/ PERT charts



They all provide the user with a graphical approach to viewing the relationship between the tasks, showing dependencies and working out minimum and maximum time allocations.

These techniques are virtually always driven by a software tool, such as MS Project.

Bar Chart versus PERT Chart

Characteristic	Bar chart	PERT chart
Timing	Clearly shown	Not clear
Logic	No logic shown	Shows dependencies clearly
Familiarity	Easy to understand	Needs more explanation
Presentation	Can be scaled down to A4	Plans hard to read and do not scale down

Some of the characteristics and pros and cons of the Bar and PERT chart techniques are shown here.

Many of the planning tools provide alternative views on the plan, to enable the same information to be viewed and printed in either form, depending on the requirements of use.

Tool Parameters

The information that a tool will need in order to create a planning chart of the task:

- Activities
 - work required plus waiting periods
 - realistic

What are the activities to be performed - are there any required delays or start time constraints on any of the activities?

- Events
 - start finish

What events are needed - receipt of final specification or handover of product?

- Relationships

What are the relationships (if any) between the various work items?

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Main Outputs of the Planning Process

The main outputs of the planning process are three related but distinct deliverables:

- A management plan
- A technical plan
- A quality plan

It may be decided to combine all of these into a single document, but this depends on the size and complexity of the task.

A **Management Plan** includes the following information:

- Validates the business case
 - Cost
 - Timescale
 - Organisation
 - Resources
 - Risk
- Including overheads e.g. reviews, meetings, documentation

A **Technical Plan** identifies:

- Architectures
- Products/deliverables
- Dependencies
- Alternatives/variables
- Structured according to chosen life cycle model

The technical plan, concentrates on the possible technical strategies and solutions, and the deliverables that are required.

The **Quality Plan** outlines the quality requirements, and the strategies that are to be employed to ensure that these quality requirements are met. Many of the techniques listed here are covered elsewhere in other sessions of this module:

- Quality criteria by stakeholder
- Validation and verification strategy
- Techniques and methodologies
- Configuration management
- Documentation standards and index
- Audit mechanism
- Post implementation review

Planning Summary

To recap on planning:

- It is an iterative process that continues from the beginning of the task to its completion.
- It is recognisable in the real world team members can associate the plan with their work at all times.
- Even though it is expected to change, the overall structure of the plan should be robust.
- Local and organisational culture and experience should be embodied into the plan, and the life cycle and associated risks taken into consideration.
- Each of the management, technical and quality planning dimensions are covered either in a single document, or in three separate documents.


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Budgets

Before we begin to look at cost estimates, let's have a brief look at budgets.

In many circumstances, budgets are often allocated prior to real need and requirements being identified or specified. This is simply a pot of money which has to last over a certain period to enable certain functions to continue to operate.



Budgets must not be confused with estimates, and must always be treated as separate items, despite that the costs have to come out of the budget it must be remembered that one is a **target** and one is an **estimate**, and they should be managed accordingly.

Cost Estimates

In the Information System world we often talk about **cost estimation** when we actually mean estimates of:

- staffing effort for production and/or maintenance,
- project duration, or
- staffing levels for a project.

The remainder of this session is concerned with estimating effort and duration not necessarily translating those figures into costs or prices, as these are dependent upon local cultures and customs.

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Estimates

An Estimate is....

- An unbiased prediction
 - most likely value
 - qualified by upper and lower bounds
- Understandable within the context of
 - assumptions
 - inherent risk
 - estimation method
- Transitory
- An input to other processes

An Estimate is not...

- A target or constraint
- A planning value
- A single fixed value
- A price
- Fixed for eternity
- An end in itself
- Least possible value with non zero probability

An estimate should be an *unbiased* prediction. Which means it is the most likely value, qualified by upper and lower bounds.

In order that someone else can understand and use an estimate, it is also necessary to specify the assumptions that were made when the estimate was made; the risk associated with the estimate; and the method used to

make the estimate.

Estimates must be regarded as transitory (i.e. date sensitive) as an estimate is only meaningful at a particular point in time and will be superseded later.

An estimate is also input to other processes. It should be used in bidding, planning, process monitoring.

Estimate Scope

It is important to be sure that the scope of an estimate is well defined by both the estimator and the estimate user.

The estimator must state the **unit** in which the estimate is delivered.

For effort this may be staff hours or staff days but it is important to ensure that any assumptions about how many hours there are in a day and/or how many days there are in a week are clearly understood.

For duration, it is necessary to be clear whether days are calendar days, elapsed working days, or shifts.

It is also important to be sure that it is clear what activities are included in the estimate.

- Is management time included?
- Is validation time and quality assurance effort included?

Bounds

It is important to provide some ideas of how trustworthy an estimate is.

One way of doing this is to present the upper and lower bounds on an estimate.



These may be regarded as the optimistic/pessimistic values but should have probabilities attached to them i.e. the lower bound can be defined as the value that has an 0.05 (or 0.0 1) probability of not being achieved, the upper bound has a 0.95 (or 0.99) probability of not being exceeded.

Information System staff often object to the concept of providing a lower bound to an estimate on the grounds that "senior managers will use the lower bound and ignore the other values". This attitude is due to a misunderstanding of the purpose of estimates.

Estimates used as inputs to the bidding process are required to assess the internal costs of producing a product in order to assess the best price to bid. There are factors other than profitability that can determine the price of a bid. However accurate assessment of profitability is important. Managers who use a lower bound to assess internal costs and hence determine profitability are only increasing the risk that their assessment of profitability is incorrect. Senior managers are allowed to make any pricing decision they like, what they should not do is ignore the real internal costs.

Similarly there should be no incentive to use the lower bound values for estimates to drive the planning process, since this only increases the risk of overrunning budgets and schedules. A planning process where full information about estimates is recorded and available to interested staff, helps to avoid situations where line managers are required to **manage** schedule and budget risks resulting from **political** estimates.

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Assumptions

It is important to make explicit all the assumptions that have been made when an estimate is constructed.

This involves two stages:

First you should state all the factors that were used to construct the estimate (these are your calculation assumptions and usually correspond to sizing measures - how big is the product expected to be?).

You then need to consider other factors that might influence actual effort that were not used to construct the estimate. These are usually hidden in the underlying estimate assumption that the future will be similar to the past.

For example, if your system has always been developed using C++ , all your past history related to C++ and so your estimate will be based on the assumption that the language used will be C++. If the use of any other language is impossible or impractical then it is probably not worth mentioning, however, if there is a chance that development procedures will be changed to require the use of Java this would have a substantial effect on your estimate.

Your need to consider all implicit assumptions (normal conditions) that may be overturned by the course of events.

This is, of course a risk!

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Use of Estimates

The users of estimates vary throughout the **task life cycle**. It is important that estimators are aware of the requirements of the people who use the estimates to make sure that they provide appropriate contextual information with an estimate. It is important that users of estimates understand the basis of the estimates if they are going to use them constructively.

At different stages in the **development cycle**, estimates are:

- required for different reasons,
- based on different information,
- derived using different methods,
- and have different degrees of accuracy.

For this reason, estimation is best considered as a process in its own right.

Project estimates are also an important input to the program management and release definition activities. However, the complexities of program management are not covered in this module.

Estimates are also used during the **task planning process**, either at the initiation of the task, or when re-planning is required. These *estimates are often more accurate* than those issued during the bidding process, but do have a tendency to be constrained by the contract and the allocated budget.

When actual effort data is collated, it is useful to use this during the monitoring process to amend the estimates so the effort remaining to complete the task can be calculated with increasing accuracy.

Care must be taken however, that the original estimates are not lost during this re-estimation. If the original estimates are lost, then the task will reach completion with 100% accuracy of estimation, as the last estimate (being the one made at the latest date) will be the only one available for comparison with the final actual data.

Estimation is particularly difficult in the field of software intensive systems because we are usually producing novel products using new methods that depend on human-expertise.

However, you can usually improve your estimation by using a structured estimation process calibrated to a specific organisation/development group.

Calibration in this sense means that the sizing measures you use must reflect the type of product you produce, the estimation models must be based on locally collected data, and the estimation process must be suited to the requirements of your development process and management procedures.

You need to establish procedures not just for making an estimate but also for putting realistic bounds on your

estimate to indicate its accuracy and consider the risks associated with your estimate.

Discussion Question 2.2: How might an organisation improve its planning and estimating procedures. Consider the following questions:

- What information is required?
- What hurdles might need to be jumped to make such procedures work effectively?

Post your answers on the discussion board.

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Links

[Project Management Glossary](#)

Task Management

Lesson 3 - Task Monitoring, Control and Supporting Disciplines

Task Envelope - Monitoring and Control | Information Collation | Cost Monitoring | Earned Value Analysis | Techniques for Identifying Potential Problems | Fault Rates | Slipping, Now What? | Action Pitfalls
 Task Envelope - Supporting Disciplines | Fagan Inspection | Test Attitude | Quality Management System (QMS) and Audits Selection and Use of Tools

Task Envelope - Monitoring and Control

In this session we are going to discuss some of the techniques that can be used to monitor the progress of the task and project, and look at some of the difficult decisions that the task manager has to make, when confronted with slippage and overspending.

Project Control - The aims of project control are to ensure that the project provides a system which meets its original objectives. Overall control is by higher management in relation to business objectives; day to day control is with the project manager. The purpose of control is to run the project as far as possible according to the plan and schedule. When deviations occur the control actions are limited:

- Adjustment in the use of resources, e.g. personnel, overtime, machine time.
- Detailed rescheduling of the project.
- Re-planning (which implies not meeting the project objectives).
- Canceling the project.

Before control can be applied it is necessary to have accurate information on which to base the control decisions. This information needs to be collected compiled into a form in which it can be analyzed, and then analyzed. This will then lead to report generation showing the status of the task or project at a specific point in time, with recommended recovery actions if necessary.

Many IS (and other) professionals will recognize the 99% complete syndrome, This is what we want to try and avoid, and be able to show accurately the status of the task.

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Information Collation

Task No.	Desc.	Planned Start	Planned Finish	Actual Start	Actual Finish	Exp. Duration
14	Design Layout	12 Jul	12 Aug			
18	Prepare Budget	5 Aug	12 Aug			
25	Book Space	12 Aug	10 sep			

Gathering the information on which to base a decision can be the hardest task of the manager. Often, measurement information is not collected that would answer the questions that you need to ask, and it is therefore necessary to design forms specifically for your purpose and get them completed on a regular basis. The forms should be kept simple, and only request the information that is needed.

Collecting duration information - as shown in the above table, is of limited use if you need information on how much resource has been used, and how much progress has been made.

Beware, that the human mind is optimistic when measuring how far a task has progressed - even more optimistic that it was in estimating the duration in the first place.

Also, the percentage complete always begins at zero. As time rolls by and the work gets done, this estimate rapidly increases. It generally increases more rapidly than the work itself. Soon, the team realize that they cannot go back. Reporting a figure less than last week's would show negative progress. Thus begins a lengthy period when the percentage completed figure is close to, and even approaches, but never actually reaches 100%.

This is referred to as the **99% complete syndrome**.

Take a few minutes to think about this statement. Has this ever happened to you ?

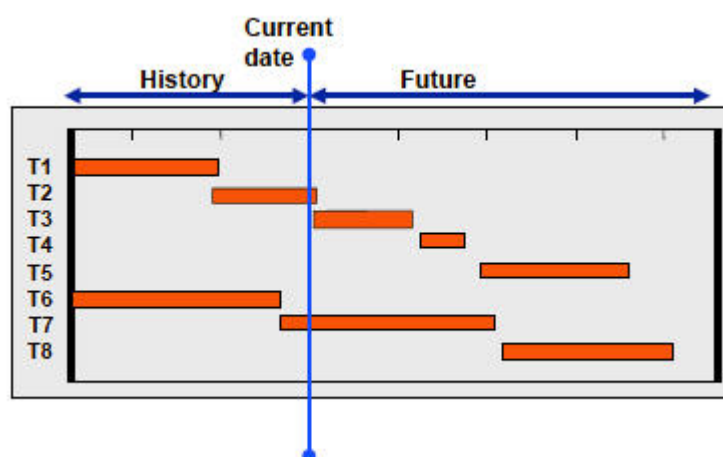
Progress Chart

Many people make the assumption that because for 5 days, people have been working on their tasks, 5 days' work must have been done.

This is extremely dangerous.

Did the people really do 5 days' work? Was it useful work, and was it spent on the right tasks? Just because eight architects have been working away on the design of a new office block, does not mean that they have done much useful work. They might have been painting the drawing office, or working on another building, or they may have had to throw away the work they had done and start again. Frequently time is spent overcoming obstacles or finishing other projects and tasks.

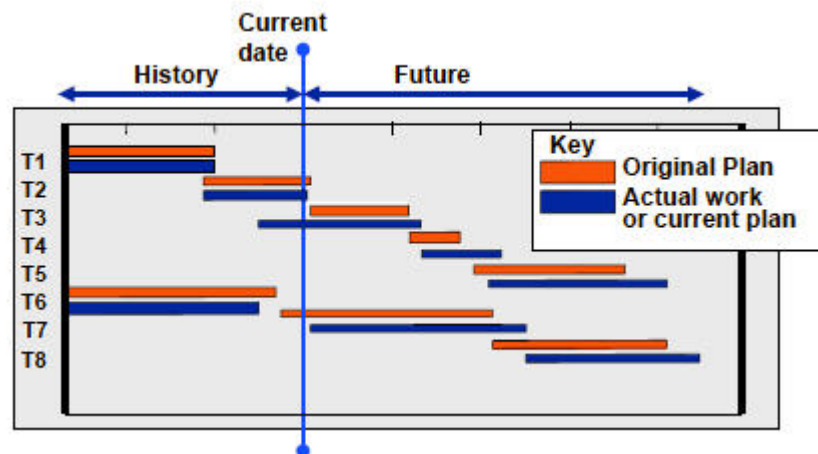
It is also important to remember, that although information is needed to understand the history (what has happened thus far) it is not possible to change the history. One only has the capacity to change the future.



So a simple chart as shown above, showing the tasks that have been completed and those still to be started based around the current date, is a useful starting point in any monitoring process. This is shown on the original plan for the project and indicates in reality what **SHOULD** have been done, and what is yet to be done. There is a temptation to amend the original plan, but in doing so, you are likely to lose information that will be needed in your project closure report or your post implementation review.

Slippage Chart

It is more useful, therefore, to freeze the original plan, and show the actual work performed and the current plan super imposed on top of the original plan.



This graph shows a scenario where T6 was completed early, and instead of starting T7, the team decided to start T3 early. For whatever reason (it could be that T3 has turned out more complex than originally thought, or that a lot of rework is needed due to the dependency on T2, and T2 is not yet complete) the current plan shows that T3 will slip. Also because the resources are being elsewhere employed it is not possible to start T7 until T2 is complete, T7 and T8 will also slip.

Normally the team would get a copy of the new bar chart to enable them to predict when their involvement will be required. It is a fact of life that projects are delayed, and this in itself need not be due to bad management. It is, however, bad management not to know how much the project has been delayed and what the effects are.

Identifying projects early is an opportunity to become visible and solve problems, especially when the problems are not of your making.

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Cost Monitoring

It is also necessary to track expenditure against budget.

This is often performed by way of calculating the difference (variance) between the original allocated budget for the task and the current predicted total cost of the task.

$$\text{Variance} = \text{Original Budget} - (\text{Actual Cost} + \text{Cost to Complete})$$

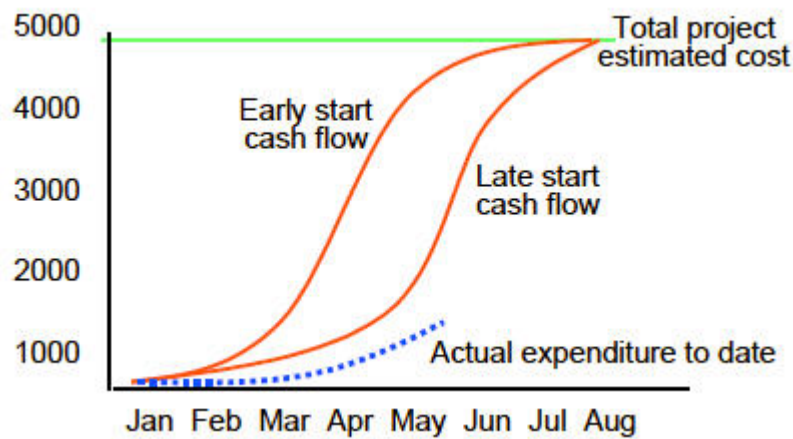
$$\text{Variance} = \frac{\text{Original Budget} - (\text{Actual Cost} + \text{Cost to Complete})}{\text{Original Budget}} * 100$$

An element of this current predicted cost must be the actual cost thus far. The nearer you are to completion therefore, the more accurate your variance figure will be.

It is either expressed as an absolute value, or as a percentage.

Cash Flow Monitoring

An effective way of monitoring cash, might be to plot the actual expenditure against the expected expenditure if the project began as early as possible, or as late as possible (Early start and late start). This will indicate whether your cash flow is on target or whether you have a problem that needs investigation. In any case, there is a significant amount of interpretation required.



Study the graph. It shows an underspent. *Is this good or bad news?*

Perhaps the project manager has found a cheaper way of doing the tasks? Maybe the project is way behind schedule, not enough work has been done so far, and therefore you can expect to finish miles behind schedule it is either better or worse but we don't know which. On its own therefore, the graph is of little value it needs to be studied alongside additional information.

Discussion Question 3.1: What information might this be? Post your answers on the Discussion Board.

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Earned Value Analysis (EVA)

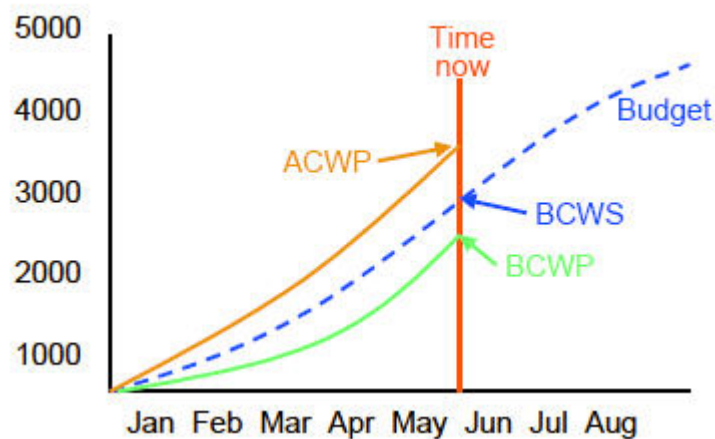
At first glance, EVA seems to be a very simple and effective way of monitoring progress and cost. It suggests that you compare the value of the physical work that you have done with the value of the work that you should have done.

You measure the actual amount of work that has been done at a given date and multiply those amounts by the value the cost rates used to produce the budget. You do not need to know how much has been spent just the amount of work done and the value of that work. You can do this for each task and for the total group of tasks, and also total all the tasks for a project overview.

EVA Terms:

Here are some simple explanations of the factors and ratios used in EVA. A software tool is usually used to calculate the numbers once all the planning and progress data has been collated and input.

- **BCWS (budgeted cost of work scheduled)**
 - This is the value of the work you should have done at a given point in time. It takes the work planned to have been done and the budget for each task, telling you what portion of the budget you planned to have used.
- **BCWP (budgeted cost for work performed)**
 - This is the value of the work you have done at a point in time. It takes the work that has been done and the budget for each task, telling you what portion of the budget you ought to have used to achieve that.
- **ACWP (actual cost for work performed)**
 - This is the actual cost of the work done.



This visual demonstrates a typical graph showing the three primary EVA monitoring values. It shows a project which is currently behind schedule and overrunning costs.

This looks simple, but providing a graph of this clarity in a typical Information Systems Project can be fraught with difficulties.

It assumes that there is a simple measure of size of the task in hand, and that it can be linearly pro-rated from the start to the end of the project.

- **SVAR (schedule variance)**
 - This is the value of the work you have done minus the value of the work you should have done (BCWP BCWS)
- **CVAR (cost variance)**
 - This is the budgeted cost of work done to date minus the actual cost of work done to date (BCWP ACWP). A negative CVAR shows the current budget overrun. EC (estimated cost at completion) This is a revised prediction of how much the project will cost (taking into account what you have actually spent so far, and your current estimate to complete the remaining portion of work)
- **BC (budget at completion)**
 - This is the original budget for the whole project.
- **EVAC (estimated value at completion)**
 - This is the difference between your original budget and your latest revised budget (BC EC). A negative figure would indicate an anticipated cost overrun.

EVA in Information Systems

One of the major problems confronting the IS professional when monitoring progress, is assigning a number to indicate the size of the work required. It is easy to say that 80% of the allocated budget has been spent on the effort to perform the task but not so easy to say that the task is 80% complete.

Discussion Question 3.2: How might these problems be overcome? Post your answer in the Discussion Board.

Discussion Question 3.3: Answer the following questions in the Discussion Board.

- What sort of IS projects can EVA be easily utilised?
- Could you use it for your IS project?
 - If not, why not?
- What additional information would you need?
 - Where would it come from?

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Techniques for Identifying Potential Problems

Having looked at *duration* and *cost* based progress monitoring here are some additional techniques that are often used in an Information Systems context.

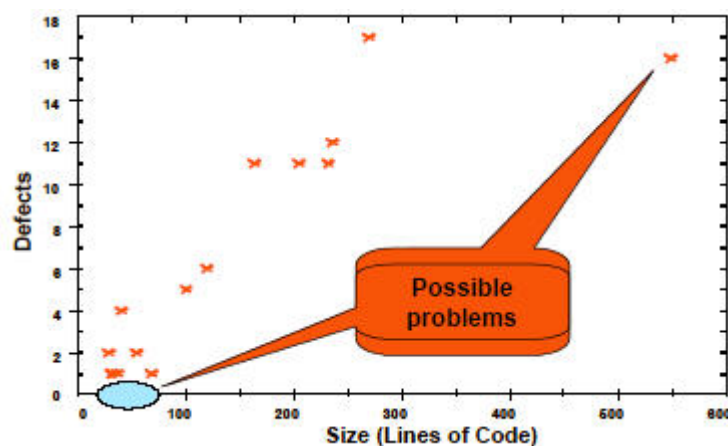
Phase based monitoring monitors actual values of project or product attributes against those expected at key points in the task lifecycle. It consists of looking at the status of the project at suitable points during the development. It is based on assessing the values of appropriate attributes (effort, duration, problem rates etc.) to establish if progress is satisfactory. Phase based monitoring assumes that quantifiable targets (i.e. plans) are established for all tasks and outputs associated with each stage in the process. Monitoring involves checking the adherence or otherwise of the development process and products against those targets.

Anomaly detection is usually performed at phase end when objects handled in a phase are in a comparable state. It involves investigating whether any objects have unusual or potentially dangerous characteristics. Anomalous objects are likely to require management consideration and possible corrective action, if the project is to meet its goals. Anomaly detection identifies product components that have 'unusual' characteristics on the grounds that anything out of the ordinary may present a threat to a project or product.

For example, a component with an unusually large number of known defects logged against it, might pose the threat of poor product reliability due to residual defects.

Trend analysis looks for patterns over time that are inconsistent with plans.

Scatterplot of Size Against Defects

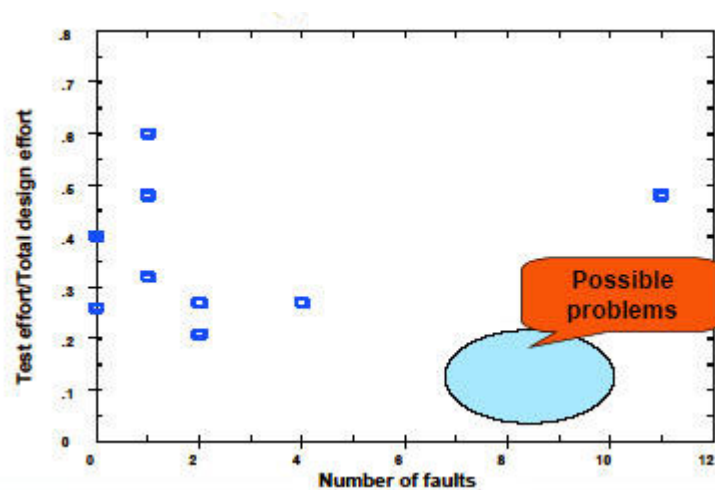


Another means of identifying unusual components is to use **scatter plots**. These allow you to consider two characteristics at the same time, for example, component size and defect or problem counts. Components that are different (visually isolated) from the rest may be indicators of problems. For example, a large component with a low defect count may not have been sufficiently tested.

The above scatterplot shows a typical scatter plot relating component size to number of defects (errors). It is usual to observe that size is positively related to number of defects but there will probably be several components with unusual combinations of values.

In this scatter plot there is one large program which has relatively few faults for its size. It could be a badly tested component many of the possible functions have not been tested, and still contain many undetected defects.

Normalised Test Effort Against Faults



This scatter plot shows the ratio of component testing effort to total development effort plotted against the number of faults found in testing. The ratio is used in an attempt to normalize the effort value that will clearly vary with the size and complexity of the component.

Components with a low test effort ratio and a high number of faults are problem modules they needed to be reviewed to identify whether the best strategy for dealing with them is more intensive testing or re-design.

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Trend Analysis

There are two methods of trend analysis:

- time based monitoring
- intercheckpoint monitoring

These forms of monitoring are particularly important if there are long periods of time or large expenditure of effort between checkpoints or milestones in a project.

Time-based monitoring is the process of monitoring the behaviour of an individual object over time. The aim of the technique is to detect deviations from an expected trend.

An example of this is deviation of the reliability growth of a system from that predicted by a reliability growth model.

Intercheckpoint monitoring is the process of monitoring the inter-phase status of the project by observation of build-up of activities and intermediate products towards a checkpoint. This allows continual monitoring for abnormal situations.

An example of this is to monitor the size or complexity of components entering integration. It is useful to check that there is no systematic trend to early completion of small, simple components leaving only limited time for testing more complex ones. Other measures to monitor could be:

- the cumulative number of inspections performed to date;
- the cumulative modules through design, code, unit test;
- cumulative number of system tests run per week.

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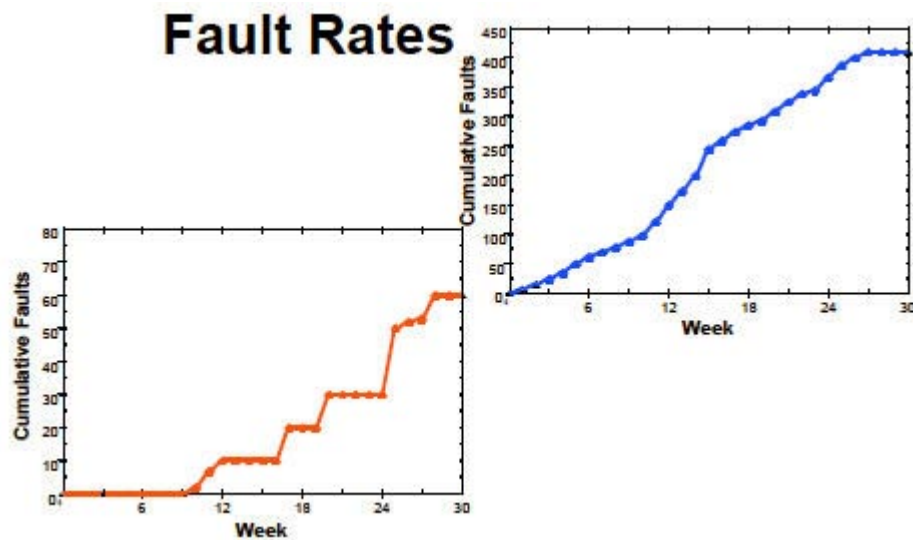
Fault Rates

Anomaly detection and trend analysis can be used to identify potential problems in a number of different domains including personnel and process issues, not just product quality.

For example, if an area of concern is personnel shortfalls then you might decide to monitor staff

turnover by skill categories, or if you were concerned about effort and timescale delays then you could monitor testing and debugging progress per week for defects detected and cleared or tests successfully completed.

These two graphs give two examples of simple plots that can be used to identify potential problems.



Monitoring of progress is interpreted in terms of our expectations and plans. Both graphs show of the number of observed faults against time as recorded as part of system test.

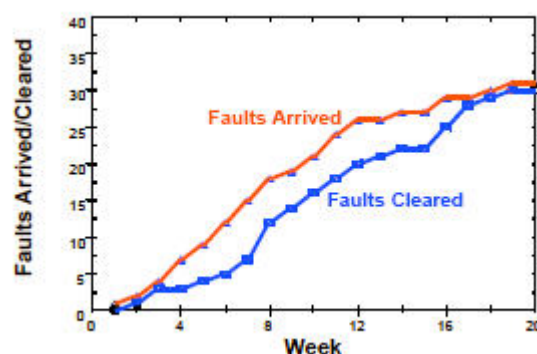
The **blue line** shows an example of the trend that would be expected if testing of a single self standing product was progressing normally.

The **red line** demonstrates the type of plot obtained if two subsystems, or hardware and software, or even two software packages are interfering with each other. This trend arises because faults in one subsystem delay progress in the other.

Both graphs could represent an acceptable trend, provided that the trend is expected. If the actual trend shown by the red line was not expected, the project would be likely to suffer extended timescales or increased effort.

Fault Detection against Fault Removal

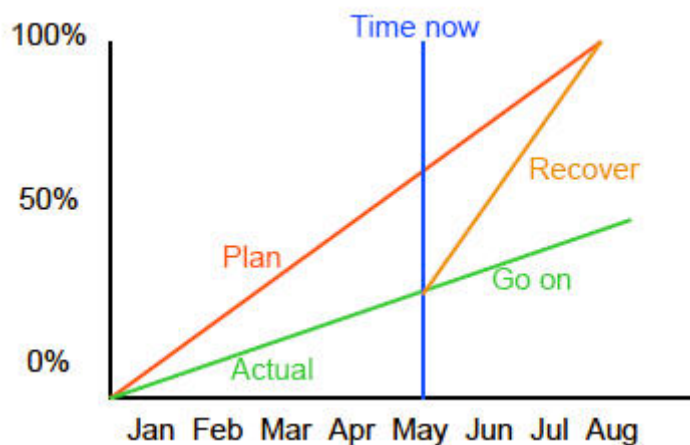
This graph shows another example of how trend analysis may be used.



For example, if *defects found* and *defects cleared* are both plotted against time and the number of defects cleared is not increasing at the same rate as defects are found, there is a danger that backlogs of defects will cause a schedule overrun.

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Slipping ? What to Do Now ?



The options are:

- Improve productivity to ensure recovery to meet original delivery schedule.
- Carry on with current productivity levels, and agree a later delivery date.
- Carry on with current productivity levels, and agree to deliver less than that which has been agreed either on a temporary basis, or a permanent contract reduction.
- Stop the project, and cut the losses.

This graph shows a project or task which is slipping, and a decision needs to be taken on how to proceed.

Discussion Question 3.4: What are the cost and resourcing implications likely to be of each of the above options? Post your answers to the Discussion Board.

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Trade-off Considerations

When problems occur, recovery actions need to be taken. Almost certainly this will involve some trade off, the question is what is appropriate and acceptable from both supplier and customer viewpoints.

If the budget is the critical parameter then either the time scale must slip or the project work content must be reduced.

If time scale is the critical parameter then either budget must be increased or work content reduced. Trying to compress the time scale for the same work content leads to a disproportionate increase in costs.

Budget	<ul style="list-style-type: none"> • Slip timescale • Reduce content • Sacrifice quality
Timescale	<ul style="list-style-type: none"> • Reduce content • Sacrifice Quality • Increase Budget

Both of the above scenarios imply pressure on the project team and the first casualty in these cases is often product quality. It is possible to make a conscious trade off of quality with critical timescales by reducing the amount of testing to be performed. The implication of this is that life time costs of effort and cost increase disproportionately, due to the high cost of fixing problems as we move into field use.

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Action Pitfalls

- Plans become out of date
- Problems will go away
- We can make up slippage later
- Everybody will work overtime
- Get extra staff in

- Manage the plan not the job
- Keep it unobtrusive



Project plans are forecasts of the future and may well require frequent change.

One of the worst mistakes a project manager can make is to continue to use a project plan that is no longer applicable. It is important to recognize problems as soon as possible and take action to overcome them. Neglected problems only grow bigger. It is often tempting to assume, particularly in the early days of a project that it will be possible to make up time later on. This hardly ever happens. Slippage in the schedule usually implies underestimating complexity or over estimating productivity or both.

In order to retrieve a timescale overrun situation, it may be possible to introduce overtime working although there are limits to this. Additional man power resources can occasionally be introduced into project teams, but it must be done early or Brook's law will come into effect, "*a late project will become later still by adding manpower*". The main reason for Brook's law is that the new schedule must allow for training and familiarization and when this is done the new schedule may well look worse than the original.

It is more likely that at review time, escalation of costs will result in a watering down of the proposed system to keep within budgeted development costs. The danger is that too many of the potential benefits are whittled away so that the system that is finally introduced no longer delivers benefit, just a cost in perpetuity. The worst form of action.

Project management should be kept unobtrusive but ensure that relevant up to date information is collected.

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So, to summarize, regular monitoring and review is essential for the success of the task or project.

Do not hide your head in the sand !

Appropriate measurement is crucial – ensure that effort is not wasted, collecting information and data that is not needed for the purpose of your project or task.

Measure product and process – not people ! Or the people will retaliate !

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Task Envelope - Supporting Disciplines

This part of the lesson introduces five areas briefly.

The objective of this session, is to ensure that the students are aware of the totality of issues surrounding complex IS projects.

Take a couple of mintues to brainstorm some ideas of "which disciplines you would class as supporting ones to the main creative tasks within an IS department ?"

What Supports an IS Task?

These topics may seem to be very software oriented, but the disciplines and skills required for each of them are required whatever the role within an IS environment:

- **Documentation** is required to ensure that everyone has access to information important to their task, and that records of decisions can be kept to enable details to be traced.
- **Configuration management** is required to ensure that when a document or a piece of software is being used it contains the latest information, and is consistent with information in other documents and/or software.
- **Verification and validation** is necessary to ensure that the product that is delivered is of appropriate quality it enables constructive critique over work performed in a formal structured environment, so that the product is delivered or document issued with minimum problems.
- **Quality management systems** provide a framework within which all the processes employed can be improved upon, and the audits are necessary to ensure compliance with these processes.
- Be they **wordprocessing or software design tools** you need to ensure that they help and not hinder the overall manufacturing process that you are trying to create and adhere to.

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Documentation

Discussion Question 3.5: Take a typical IS development project, now identify the following documents:

- Management documents - planning and reporting
- Technical documents - specifications, designs, test reports
- User documents - operational and user manuals, training materials

and answer the following questions:

- When is it created?
- Who reviews it?
- Who reads it?

Post your answers in the discussion board.

Configuration Management

*Configuration management is like accounting its not an exciting subject unless you ignore it, then your life may get interesting in ways you will **neither expect nor enjoy.***

Configuration Management comprises four primary disciplines:

- **Configuration identification** - Knowing what items are under configuration control and how to identify them.
- **Configuration control** - How to handle Change Requests, deal with emergency situations, how to build releases of correct versions of components and control variants.
- **Status accounting** - Tracking the items and managing transitions between one status and another.
- **Auditing** - Proving it is being done properly.

Discussion Question 3.6: Taking into account the above principles, have you ever had a project crisis caused by inadequate control of changes and versions of components or documents ? Post your answers to the discussion board

One public domain disaster story is as follows:

"In 1985 at the Bank of New York, a small, uncontrolled change was made to one of the bank's on-line systems. On the morning of the 20th November more than 32,000 transactions were waiting to be processed. The software began to corrupt these and the bank lost control. The Federal Reserve continued to deliver securities until the Bank of New York was \$2 billion overdrawn. It was finally fixed, but \$5 million was lost in interest on the loans to cover the problem."

Verification and Validation (V&V)

Verification and Validation are the processes applied to ensure that quality is built in to each and every component and product at the appropriate point in its development.

These definitions here attempt to clarify the terms that are often abused within the IS industry.

- **Verification** is the process of comparing the output of a task against the input of a task, and checking for internal consistency and completeness.
- **Validation** compares the output of a task with the users' statement of requirements to ensure that the work just completed is consistent with the users' needs.

The phrase **V,V&T** is often used in Information Systems quarters **Verification, Validation and Testing**.

In actual fact, testing is just one of the techniques that can be used to undertake either V or V. So it is more accurate to refer to this as V&V. This also removes the emphasis from software, as it is important that V&V are applied to other products such as documentation, reports and presentations as well as software.

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Fagan Inspection

Fagan Inspection is a technique that was developed by **Michael Fagan** at IBM during the 1990s. It enables effective fault removal throughout the life cycle, and can be used on any component that can be *read* and studied by a person.

Fagan's claim that documents are only formally complete after V&V is carried out, provides a basis for sound product control, and lowers the risks associated with failure to comply with *user requirements*.



Fagan Inspections comprise three phases:

- **Preparation**
 - Administration by nominated moderator.
 - Optional overview by author.
 - Individual study (formal) work alone for 1-2 hrs.
 - Prepare list of suspected errors which increases meeting productivity.
- **Meeting**
 - Meetings limited to 2 hours which is deemed to be the limit of effectiveness (large documents may need several meetings.)
 - All inspectors plus moderator attend usually 3 to 8 people.
 - Document paraphrased by authors peer.
 - Defects are reported and logged as they arise, as the aim of the meeting is to find errors and not correct them, their classification regarding importance and severity is agreed later.
 - A third hour is available if required this is to enable discussion of potential cures, and to capture the information collected.
- **Rework**
 - All defects must be repaired:
 - The Moderator is personally responsible.
 - Document not released until complete.
 - Moderator can demand re-inspection:
 - Usually because not satisfied with repairs or because of a high level of problems found in initial inspection.

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Test Attitude

Although testing is of great importance in the software development life cycle, there is unfortunately a prevailing attitude towards testing that regards it as rather *unexciting*.

Testing is thought of as a menial task, not like a creative job like programming.

Testing someone else's programme is like cleaning up their mess, and so it is not a popular task.

There are conflicting demands of creativity versus repetitive testing.

General inertia - "we've always done it like this" also has a significant effect on working practices.

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Quality Management Systems (QMS) and Audits

Quality is not an accident but the result of intelligent effort.

Nowadays, quality is the key to market success - poor quality leads to considerable rework and maintenance thus reducing the productivity of the developers and, as a consequence, either increasing cost or reducing functionality.

Quality cannot be added-on to a low quality product, quality concerns must accompany the complete development and maintenance processes. This is performed through establishing an infrastructure of quality oriented techniques and controls, that are managed at a high level in the organisation.

This infrastructure is called a **Quality Management System**, amongst other things, it will contain all the processes that control all of the topics thus far discussed in this session.

Note: There is an established series of international standards and guidelines, known collectively as ISO 9000. If you are not familiar with the requirements of these standards, it is recommended that you research them, and assess the implications for your own organisation.

International Organization for Standardization - <http://www.iso.ch/iso/en/ISOOnline.frontpage>
Welcome to ISO Easy ! - <http://www.isoeasy.org/>

Implementing a QMS

In order to implement a Quality Management System in an organisation that as yet does not have one, it is necessary to undertake the following steps:

- **Obtain management commitment** - Without management commitment, the project will flounder and resources will get re-allocated an implementation project could take upwards of 2 years from start to certification.
- **Develop quality policy** - and sell the concepts to the staff - it helps to get everyone on board and willing to co-operate (often easier said than done!)
- **Establish standards and procedures** - Try and standardise on ways of working before documenting them - this will simplify the paper work enormously - however beware, you could alienate some staff members in doing so.
- **Introduce internal auditing** - Train key staff to undertake audits, and stress that it is the process that is being audited - **NOT THE PEOPLE!**
- **Handle deviations** - Ensure that mechanisms are in place to track and make changes to the processes, should it be shown by the auditors that they are not functioning as required.
- **If required - obtain certification** - but beware of the "certificate on the wall syndrome", where once the certificate is obtained, the processes relapse to their former chaotic state.

Audits

It is not always immediately apparent whether the processes employed are providing the benefits that are expected. Therefore, it is necessary to undertake regular audits on the details of the processes and of the products.

Undertaking an audit requires excellent human communication skills, plus the diligence and determination to get to the bottom of problems. Audits must be planned, undertaken and feedback given without resulting in victimisation problems.

Remember you have to continue to work with your colleagues after the audit.

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Selection and Use of Tools

Regardless of whether you need a new word processor, or you need an analysis and design software tool, it is essential that an effective selection process is used.

Software tools are not only expensive to purchase, but they can also be expensive in the way of time wasting if they are not exactly suited to your needs, or if inappropriate training is provided.

Many of the processes already covered in this module are supportable by software tools:

- Estimating
- Planning and progress monitoring
- Configuration management
- Software testing
- Requirements analysis and design
- etc. (can you think of others ?)

Establishing an appropriate infrastructure to help make effective use of the available tools can provide an organisation with significant cost savings.

One effective but non-trivial mechanism that can be applied to assist in the selection and evaluation process is as follows:

- Evaluate requirements and select candidate tool
- Baseline current quality and productivity levels
- Select typical project and trial the new tool
- Measure new quality and productivity levels

Why might this approach be non-trivial?

Because it relies on a mature programme of collecting and analysing quality and productivity measurements. Very few organisations in the IS industry have the capability to do this, but where it has been performed, good results have been shown.

Discussion Question 3.7: Taking into account the above approach, what measures might be needed, and how would they be analysed ? Post your answers on the Discussion Board.

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To summarise, each of these topics; documentation, configuration management, verification and validation, quality management system and audits; selection and use of tools; work hand in hand to help ensure that the success criteria are achieved, and the task envelope is maintained.

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Links

[Project Management Glossary](#)

Task Management

Lesson 4 - Introduction to Task Management

Task Envelope - Managing Risk | Risks and Risk Management | Goals of Risk Management | Hazards | Techniques for Hazard Identification | Risk Assessment and Prioritisation | Risk Reduction Strategies | Risk Action Plan | Risk Monitoring
 Task Envelope - Completion | Customer/Supplier Relationship | Planning Acceptance | Maintenance | Mission Accomplished ? | Gathering Data | Project Log | Case Study - London Ambulance Service

Task Envelope - Managing Risk

This session discusses some of the principles and techniques that can be applied to improve the probability that a task or project will meet its success criteria. That is deliver its required products with appropriate quality levels in the required timescales, and at a cost which enables the development organisation to remain competitive.

Any project could overspend or fail one of the other criteria for success due to one or more of the following reasons:

- Failures in planning and design.
- Changes in the circumstances surrounding the project.
- Undertaking a project that was infeasible to begin with.

It is rarely economically viable for an individual task to retain sufficient contingency in the pot to cover all such eventualities. This means that risk needs to be managed at a higher level and ensure an overview of all the tasks and projects is retained with a pot of contingency that can be allocated across all the projects. It is important therefore to understand the risks associated with each task or project as if all the tasks that an organisation undertook were classed as high risk then the contingency pot could soon run out.

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Risks and Risk Management

Successful businesses are distinguished by the way they manage **risk**.

- **Take no risks and the business will stagnate and die.**
- **Take foolhardy risks with no thought of the consequences and the result will just as surely be the destruction of the business.**

It is common sense to identify the risks to be faced before starting major projects or contracts and to adopt the strategies needed to overcome them. This is the **essence of risk management**.

Risk is present in all human activities and is usually regarded in physical terms. It is often seen as health and safety related (for example, both the immediate and long term effects on health of exposure to toxic chemicals) or economic (for example, destruction of equipment and lost production due to fires).

The objective of risk management in this context is *to control, prevent or reduce loss of life, illness or injury, damage to property and consequential loss and/or harm to the environment*.

The concepts and processes of risk management are well established for dealing with risks from the use of a technological product or its interaction with the environment. When dealing with risks to a task or project, however, we are dealing with risks of a different nature.

Problem

It is also important to realise, that when the event actually occurs it requires action. These actions are often planned as part of the contingency planning process and which itself is part of the management of the risks.

However, once the contingency plan has been activated the risk no longer exists, and it can be removed from the managed list of risks.

What is Risk ?

A combination of the probability of the occurrence of a hazard (event) and the consequence of its occurrence.

Risk involves a combination of the frequency (or probability) of occurrence of a hazard and the consequences of the hazard occurring. The concept of risk always has these two elements of *probability* and *consequence*.

When we hear of risk in everyday life it might be, for example, the chances of a fatal accident when using different types of travel, or it may be a statement that the risk of such an event is very low. This is a little unfortunate as it focuses on the probability aspect, not on the composite aspect of risk. This can lead to inappropriate decisions being made. To do effective risk management we must use both parts of the risk equation.

What is Risk Management ?



The process of risk management is a simple iterative process of:

- identify the hazards or threats;
- assess the probability and consequences of occurrence;
- plan what you are going to do about it;
- reduce the chance or impact if it occurs;
- create contingency plans, and monitor risks.

Cost / Risk Balance



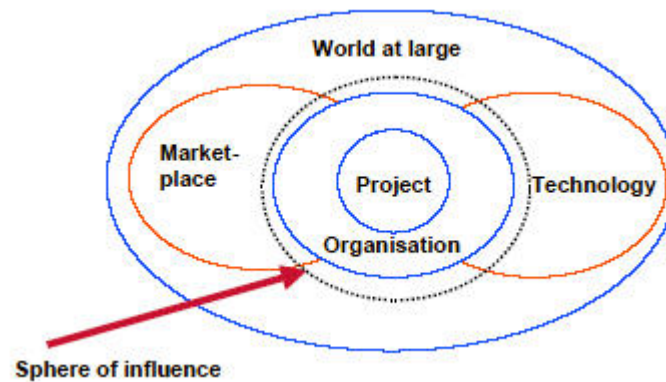
Risk management and particularly risk reduction does not come free.

There is always a balance to be struck between the level of risk minimisation and the level of acceptable cost.

This balance is also affected by the FUD factor that is the amount of fear, uncertainty and doubt that is present in those undertaking the task or project.

A good illustration of this is how the insurance market works how the calculations are made for various types of insurance, and how much consumers are prepared to pay for it.

The Project World



It is also important to recognise that a number of factors that influence the risks that face you are often outside your influence or control.

The timescales for delivery can be controlled by the market place; the probability of not getting the chips required for the development might be controlled by technology used and the market place.

Who would have predicted, however, a world shortage of memory chips caused by a factory burning down. These are not directly controllable events.

Risk management will aim to control and manage these risks by finding alternative solutions, but events such as the chip factory fire will almost invariably lead to crisis management.

Discussion Question 4.1: Have you been in a situation where an outside force influenced the outcome of your project ? Post your answer to the Discussion Board.

Consequences

		Duration Overrun
1 week	\$2,000	No impact on customer business
1 month	\$20,000	Some impact on customer business
3 months	\$200,000	Major impact on customer business

Consider an example, where a project is producing a system to support a major business venture due to start in 2 months time.

In the example,

- a one week overrun involves a minor penalty to the suppliers organisation and is of little consequence to the customer,
- one month overrun hurts the supplier more, but still has little impact on the customer.
- a three month overrun has massive penalties for the supplier, but even these may be dwarfed by the losses the customer faces if the project is this late,

The different manifestations may need to be dealt with as separate high level hazards.

The above may seem a trivial example, but consider instead if the product being produced is a friendly or foe detection system for missiles to be fitted to ships of the national navy.

One week delay has little impact, one month means ships are having to be rescheduled for return to home port to have the system fitted, three months delay and ships may go unprotected into a war zone with consequential results that the ship or ships are lost.

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Goals of Risk Management

Project risk management aims to identify and respond to potential problems in time to prevent crisis situations and, therefore, to improve the probability of a project succeeding. The aim is not just to know about the risks but to put in place actions and plans to bypass or reduce the problems associated with those risks.

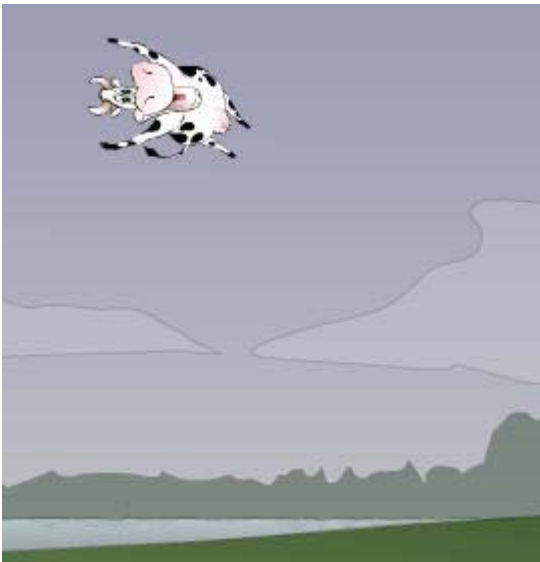
It therefore is concerned primarily with those risks to the project (and to its underlying development and maintenance processes) that mean the project will not meet its success criteria,

Before considering the application of project risk management it is useful to position risk management with regard to standard project management. Traditional project management is concerned with planning a project and controlling it against the plan which itemises the project tasks, their resources and their interdependencies. Project management attempts to ensure adherence to plans by providing leadership and direction to the project as a whole and making decisions as required based on information derived from project monitoring.

Risk management attempts to ensure project success by trying to identify and control those factors that are not itemised in the plan and that might cause the project to fail to meet its success criteria. Risk management is complementary to standard project management, and represents another tool in the project manager's armoury.

Probability / Consequences

This amusing (but true) story illustrates some of the problems relating probability to consequences.



In April 1997, a Japanese fishing boat working in the Sea of Japan was **sunk by a cow that fell from the sky**.

The terminal velocity and kinetic energy of a cow is left as a class exercise !

The fishermen were rescued, and on telling the police and coastguards what had happened were arrested on suspicion of making the story up.

On investigation, it was discovered that a detachment of Russian soldiers had been doing a little unofficial cattle rustling/trading and were using army transport aircraft to deliver an order. Over the sea, the cattle broke loose inside the and started running around, causing severe control problems for the Pilot, so he opened the cargo doors to remove the problem. This proved effective from his point of view.

Hamburg Morgen Post 28/4/97, Asahi Shinbun 7/6/97.

Discussion Question 4.2: Post your answers to the following questions: Would Risk Management have been applied in these circumstances? and Would those affected do anything different in the future? if so what? on the Discussion Board.

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Hazard Identification

Identify Situations which Could Cause a Project to Fail !

The starting point for the identification of the top level hazards is the identification of the success criteria that the project has to meet.

Generic success criteria may be:

- Predicted milestones have been met.
- Project is completed on time.
- Project is completed within budget.
- Product satisfies its requirements.
- Customer and user needs are satisfied.
- Staff are happy to have worked on the project.



Project management control cannot be imposed at this level.

Detection at this level is too late to allow effective corrective actions.

Top level hazards are often in need of refinement, some are straightforward such as budget and time scale overruns, whereas other hazards may involve complex concepts and it is important that they are specified correctly, examples of this are customer dissatisfaction and poor quality.

Quality is a good example to consider: it is important to identify which specific aspects of quality are of concern to this project, is it the reliability, the maintainability, or the usability of the product. Each aspect of quality would lead to different reduction actions.

Hazard Levels

At the highest level, **a project is a failure if it fails to meet its agreed success criteria.**

This implies that top level hazards are simply the inverse of success criteria.

However, failure to meet success criteria is usually only apparent at the end of a project. In addition, it is usually ineffective to manage risks only when they occur. This means any actions taken to prevent risks from impacting project success must occur in a timely and cost effective manner. To achieve this, it is necessary to move from these high level hazards to a level at which the individual lower level contributory hazard can be identified before the project falls.

Define factors which contribute to one or more of these top level hazards. The aim is to identify hazards down to a level at which they can be managed. Sometimes these factors will be able to be treated, as hazards in their own right (and are referred to as second level, or lower level hazards). In addition factors or circumstances that are symptoms that the top level hazard is increasingly likely to occur can be identified.

Risk management procedures are intended to manage top level hazards by monitoring and controlling lower level hazards and responding quickly to symptoms of the hazards.

Lower Level Hazards

Lower level hazards are derived from the factors that contribute to the failure to meet the project success criteria.

Consider an example, user dissatisfaction, one of the top level hazards, this could be caused by one or more of the three factors:

- clumsy interface
- poor response time
- missing functionality

Factors at this level can be managed by looking for underlying symptoms of the condition then using the techniques of risk management to monitor for their occurrence and reduce the impact. Decomposition of hazards usually goes down one level, but it may be necessary to decompose to further levels.

For example a clumsy interface may be due to:

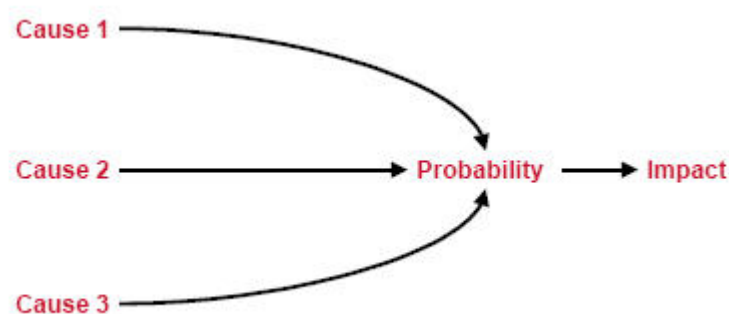
- lack of consistent interface standards
- over complex user interface objects
- poor menu structure

If the hazard is still expressed in conceptually vague terms, It will need to be decomposed further. The hazard must be decomposed to a level where it is manageable. If the hazard is expressed in non-objective terms it will need to be refined.

For example poor response time should be expressed in terms of the acceptable or unacceptable response time to specific transaction types (e.g. 2 seconds for a database update).

Discussion Questions 4.3: What lower level risks might be present in the Motor Racing Scenario?

Cause, Probability and Impacts



Cause, probability and impact analysis is another way of representing this information, where the lower level events are the causes of the hazards we are really concerned with and many causes can lead to the one event which really concerns us. We cannot manage by working with the final events, we must prevent the lower level causes.

Discussion Quesiton 4.4: In the motor racing scenario are there any linked causes that increase the probability of any of the hazards occurring? Post your answer to the Discussion Board.

Relationships between Hazards



There are often interactions between hazards and strategies for alleviating risk. This is because there are often a number of different success factors in a project, each of which will have been translated into a top level hazard and refined to create lower level hazards.

One of the success criteria is to complete to within +/- 5%, of the committed budget. The inverse of the success criteria is that we might overrun budget. Budget overruns may have many causes.

Consider the causal factor *changing requirements*. If the hazard of running over budget is managed by refusing to accept requirements changes from the customer, the project then runs the risk of not providing the customer with the functionality required!

This would then result in an increased likelihood of *customer dissatisfaction*, another top level hazard.

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Techniques for Hazard Identification

Hazard identification techniques provide a mechanism for exploiting staff expertise and experience. They help to identify hazards for a specific task or project. As with all activities associated with the management and control of projects their effectiveness is improved if access to historical information and the experience is available.

There are two main techniques for hazard identification:

- standard checklists
- scenario analysis.

Standard checklists and scenario analysis are ways of organising how we think about potential hazards. They also benefit from standard "idea generation" techniques like brainstorming and lateral thinking.

Standard Checklists

Checklists, in this context, are lists of hazardous situations that reflect potential problems likely to occur in the user's organisation. Checklists are often organised into categories and may include hierarchical decompositions of hazards.

For example, they may identify generic project hazards such as fuzzy requirements, and typically they will be categorised in a number of ways such as:

- stakeholder viewpoint
- hazard types
- hazard hierarchies



Checklists often contain questions which help to establish if a hazard is likely to occur in the particular circumstances being investigated,

For example, Has the company done this type of project before?

When no checklists exist, they can be created by brainstorming among appropriately experienced people. It is useful if these experienced people are given access to information on past projects.

Discussion Question 4.5: Prepare a "standard checklist", for the motor racing team, that could be re-used for every race. What issues occur if this standard checklist were used by other motor racing teams? Post your answer on the Discussion Board.

Scenario Analysis

This technique is similar to that applied in traditional risk management and revolves around two questions:

1. What happens if a certain condition occurs?
 - What happens to the power station if this pipe break ?
 - In software terms, what happens if the new hardware does not give the performance improvement we expected?
2. How could we get into this situation?

- For example, what could cause the project to have a schedule overrun?



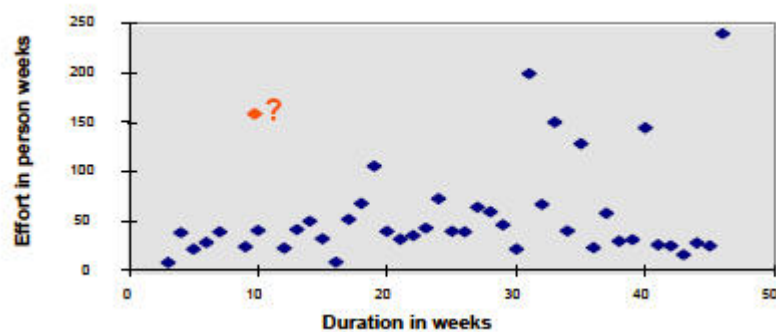
Although assessment and prioritisation is not recommended at this stage it is worth capturing the information on the consequence as it will almost certainly come out of the discussions. This is performed by supplementing two further questions What would happen then?, and So what? does it really matter?

Scenario analysis allows local knowledge to be organised by providing a structure for discussion and evaluation.

Scenario analysis is extremely dependent on the people who are involved with it. If it matches the way in which people are happy to work it is an extremely powerful technique.

Discussion Question 4.6: Develop a couple of scenarios based on the motor racing risks. Post your answer on the Discussion Board.

Capability Analysis - Effort versus Timescales Feasibility



Where detailed information on past experience exists, both the checklist and scenario approaches can be supplemented with a technique known as capability analysis.

The aim is to compare project requirements with the norm for that organisation or team. An obvious example is to compare time scale and effort requirements with past achievement.

On the graph shown above, the blue points represent all the historical projects undertaken by an organisation.

The red point identifies the required effort and duration of the new project. Initial assessment is that the new project is unlikely to be delivered on time.

Note there is a wide spread in this data, reflecting the diversity of projects undertaken by the organisation. This does place a limit on the usefulness of this data, but it is still possible to detect projects which are beyond the existing capability of the organisation.

In principle quality and performance requirements can also be assessed in this way. However they are usually difficult to assess quite as easily as they are often stated in very vague terms.

Consider the reliability of the product. If a product must be highly reliable it is difficult to know if the requirement can be achieved or not. If however the reliability requirement is stated as "no more than 1 failure per 1,000 hours of running after system test", it is objective and can be compared with the

average value for previous comparable products. If the experience was that systems had one failure per 200 hours of running after system test, then the production process probably lacks the capability to deliver the required product.

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Risk Assessment and Prioritization

To be economically effective, risk planning, monitoring and control must concentrate on the important risks. This implies that risks are ranked and ordered. It is also necessary to understand the cost and effects of different strategies for removing or alleviating the risk. The aim of risk prioritisation is to identify those risks that are candidates for immediate action, while there is still room to manoeuvre, rather than waiting until they develop into insoluble problems.

We can measure the risk associated with a hazard by the formula:

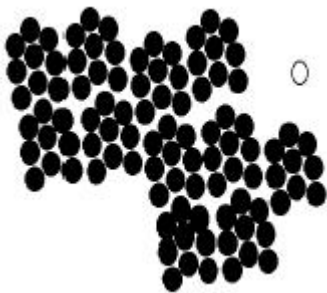
$$\text{Risk Factor} = \text{Probability} * \text{Cost of Consequence of Hazard}$$

Obtaining a numerical value for a risk allows us to assess its relative importance and address those risks with the highest value. However in practice other factors will cause some hazards to be of a higher priority, perhaps because the consequences of the hazard are so great that no matter how small the probability of occurrence is, the hazard must be guarded against.

A good example of this is the loss of the family home due to fire. We all tend to insure against this despite the probability of it occurring being very low.

When numerical values are available for probability of occurrence and the cost of occurrence, the basic equation can be used. Unfortunately in the Information Systems we often lack such values and we are forced to use subjective approaches to risk evaluation. These approaches are based either on, straight categorisation of risks or on quantification using ordinal scales such as High, Medium and Low.

Equivalent Probabilities



Before moving on to talk more about the subjective approaches, it is important to understand the basic principle of probability.

There is a 0.01 probability of picking the white ball from a bag of 100 balls, where only one ball is white.

If 50 of the 100 balls were white, then the probability would be 0.5.

Subjective Probability

As frequency of occurrence information is unlikely to be available, it is necessary to determine an intuitive scale that can be applied.

Allocate probabilities of occurrence to each of the following statements:

- Almost certain
- Highly likely
- Probable
- Unlikely
- Impossible

Discussion Question 4.7: Take a minute or two and allocate probabilities of occurrence to each of the above statements. Post your answers on the Discussion Board. There is no right or wrong answer !

This approach has significant problems because *intuitive names* in fact mean different things to different people.

In an experiment the answers of 24 people were plotted who were asked to assign a probability in the range 0% to 100% to the statement that something would be "almost certain to happen". The vast majority of answers are in the range 75% and above, but there are some that equated "almost certain" to less than 60%.

The same group assessed "Unlikely" to be between 0% and 30%. This emphasises the need to ensure that qualitative scales have a consistent interpretation by all users. In general, people are better at comparative ranking than absolute judgements!

Risk Categorisation Scales

		Probability		
		High	Medium	Low
Impact	High	A	B	C
	Medium	B	C	D
	Low	C	D	D

This is a simple prioritisation matrix. As demonstrated by the previously, it is useful to allocate meaningful interpretations of the high, medium and low points on both scales - this will vary from project to project.

These interpretations could be:

Priority:

- **High:** The probability of a 10 year old car breaking down on a long (>500 miles) journey
- **Medium:** The probability of a 5 year old car breaking down on a medium journey (approx. 250 miles)
- **Low:** The probability of a 1 year old car breaking down on a short (5 mile) journey

Impact or Consequence:

- **High:** Loss of life
- **Medium:** Serious injury
- **Low:** Bruises or scratches incurred

The values as read in matrix are:

- **A** - Risk must be reduced
- **B** - Risk should be reduced if affordable
- **C** - The risk should be tolerated
- **D** - The risk should be ignored

This is an example of how two subjective values can be combined. Used by many military and medical professions, it is referred to as TRIAGE.

Discussion Question 4.8: Derive scale point for some of the risks identified in the motor racing scenario and allocate appropriate priorities. Post your answers to the Discussion Board.

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Risk Management Planning

- For each risk under consideration
 - identify strategies to prevent the hazard
 - actions to take if the hazard occurs
- Identify risk reassessment procedure

Planning is essential, as each risk reduction activity is likely to be in addition to normal project tasks.

So if the risk reduction activities are not planned, resourced and allocated to an individual for action, then they are unlikely to be performed.

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Risk Reduction Strategies

Risk Avoidance

Means attempting to change the preconditions that could create a hazard. This might be achieved by negotiating a change in requirements. For example, if it was highly unlikely that a given project would meet both a very high reliability target and a very stringent performance target, you could go back to the user and see which is of higher priority, perhaps performance was not really that important.

Alternatively, the use of faster hardware could be investigated to alleviate the performance problems, this might be considered as a means of reducing the probability of a clash between reliability and performance requirements to zero. Failure to remove the risk completely might well leave us with a need to employ an additional risk avoidance strategy to reduce the level of risk to a tolerable level.

Risk Alleviation

It is important to take a cost effective approach to handling risk. It is easy to assume that all risks have to be completely removed, this is not the case. Risk reduction occurs when the risk cannot be removed, but actions can be placed in plans that will either:

- reduce probability of occurrence of the hazard; and/or
- reduce the consequences of the hazard

The mechanisms that are used for this are exactly as for risk avoidance, with the additional strategy of *buying* information. For example the risk of user non-acceptance of a new user interface can be reduced by prototyping parts of it. This extra action of *buying* additional information is a form of investment frequently found in risk management situations.

Many forms of *risk transfer* exist which attempt to remove or reduce a risk by transferring either the problem or its consequence to somewhere where it does little or no damage to the project.

Transfer in Time

Suppose you are worried about the consequences of a high level of requirements change from past experience with your customer. Transfer in time is achieved by defining incremental releases of the system such that any changes are delayed and attached up for inclusion in future releases. Thus the problem is reduced or removed by transferring it to a point when the consequence is planned and controlled. If the system is being supplied in a commercial situation, you would also negotiate a price change for each set of requirements changes.

Transfer in Space

Suppose you are developing a system for authorising credit and your systems analysis detects a particularly difficult borderline case to deal with. Programming this condition is difficult, because the current manual system relies on human judgement, so the system would probably need to employ Artificial Intelligence (AI) techniques. This risk can be transferred in space by, at least initially, continuing to support evaluation of this condition manually. This means we can defer the production of a software implementation. Effectively this combines transfer in space and time.

Another example involving a literal transfer in space, is drawn from early space probes. In this case there was a major operational risk because the onboard computers were not powerful enough to calculate orbital corrections. This risk was removed using risk transfer by performing the calculations on a ground based system and the transmitting the results to the probe. This was only a small system change and had in itself very low risk.

Transfer to Someone Else

Suppose you are developing a system that requires the use of AI techniques and your development group doesn't have such experience. This hazard can be transferred to someone else by subcontracting to a specialist organisation who does have the relevant experience. If, additionally you ensure that the subcontractor takes some of the impact of non-delivery of the software, by imposing penalty clauses then the risk is alleviated further.

Buying Insurance

This can take many forms, from literally buying an insurance policy, to, more commonly implementation of a fallback option which if the risk doesn't occur will be thrown away.

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Creating a Risk Action Plan

For each identified risk - it is necessary to create an action plan. This effectively documents the requirements following the identification and assessment exercises, and should be prepared prior to undertaking any action.

The aim of the plan is to:

- identify risk resolution actions;
- identify any hazards created by actions;
- identify action or contingency plans in case of:
 - failure of risk resolution;
 - new hazards arising.

Example:

Hazard - Memory insufficient due to software size being underestimated.

Risk Reduction Strategy - Do early prototype and prioritise requirements.

Constraints - Time and budget limits.

New Hazards:

- Prototype Time and effort needed and scale up problems.
- Prioritise requirements customer resistance.

Additional Actions:

- Prioritise requirements internally.
- Use incremental development.
- Use earned value tracking.

Responsibility - Jane Smith.

Discussion Question 4.9: Prepare a couple of Risk Action Plans for the motor racing team scenario. Post your Risk Action Plans on the Discussion Board.

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Risk Monitoring

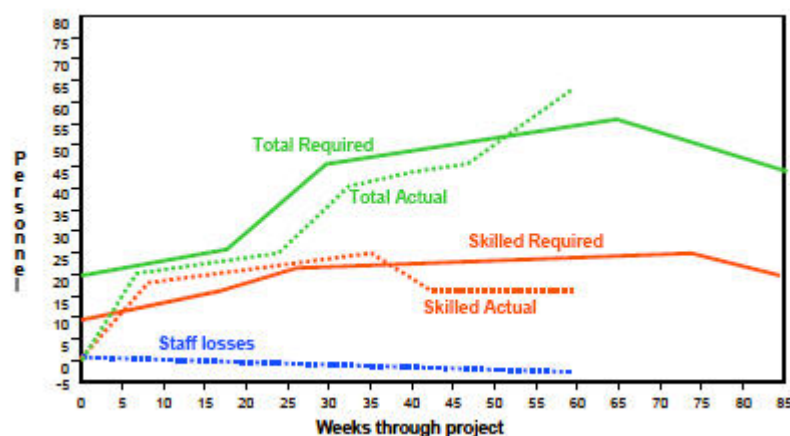
Risks need to be monitored as part of a continuous iterative process.

It may be necessary to introduce some new monitoring processes, so that symptoms can be identified as soon as they appear, and the necessary actions put into place, before the impact of the hazard becomes unmanageable.

This is synonymous with the installation of a smoke detector to trigger an alarm should a fire break out in

a building - you don't wait for the building to be burnt down before calling the emergency fire service.

Loss of Skilled Personnel Monitored By Personnel Plot



For example, an organisation may perceive an unacceptable risk to a particular project to be loss of skilled personnel. This may be monitored by plotting a graph as shown on the visual. This clearly shows that although the total number of staff on a project is higher currently higher than required, the number of skilled staff has dropped below the required level.

A decision needs to be taken on the action required by the project.

Discussion Question 4.10: How might the risks identified for the motor racing scenario be monitored? Post your thoughts on the Discussion Board.

Risk Reassessment

- Periodic reassessment at major milestones
- Recovery from crisis
- Re assess hazard priorities - old and new
- At all times monitor the behaviour of critical risks

The basic approach has emphasised the need for regular risk reassessment to detect those risks that are increasing in probability and to identify any new risks that may be occurring.

This reassessment needs to be undertaken at regular intervals and at critical points in the process.

Discussion Question 4.11: At what points in the run up to and during a race, do the risks need to be reassessed by the motor racing team? Post your thoughts on the Discussion Board.

Feedback

In order to improve risk management, we must *feedback* the results of its application to improve the management of other projects. This feedback can be at the individual level of project managers extending their own experience of risk management, but should also take place at the corporate level, and it is on this level we will focus, although many of the principles apply to both.

Improved risk management is based on two dimensions each of which needs to be addressed:

- Information dimension:
 - What are the risks?
 - What are the impacts?
 - How probable are they?
 - What actions work?
 - What detection methods?
- Experience dimension:
 - Appreciation

- Knowledgeable
- Skilled
- Expert

Discussion Question 4.12: How could an organisation initiate an improvement programme on Risk Management. Post your answers on the Discussion Board.

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To summarise, the use of risk management stimulates healthier project management, especially when a complex project, facing many hazards is being undertaken. It hopefully creates a situation where there are no surprises, and crises are prevented or swiftly handled. This leads to a reduction of costs, less rework, and more competitive pricing since risk is not managed by every person in the bid chain adding their '10%' contingency to the real estimate for the task in hand.

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Task Envelope - Completion

There is certain to be a point in time, when a task has come to an end.

- How successful was it?
- Does the product meet its requirements?
- Are you still communicating with your customer/sponsor?
- Will the product ever be used?
- Who is going to maintain it and how?
- Can we team from the experience?

This session looks at each of these issues, and explores some of the difficulties that may be encountered. We shall also look at a real life case study of the London Ambulance Service Command and Control System which was publicized in the UK during and after the formal public enquiry.

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Customer / Supplier Relationship

When a task comes to completion, there will almost certainly be a product of the task that is required to be handed over to the sponsor of the task.

This sponsor may be a client, or it may be a manager or a colleague either local to your department or from elsewhere in the organisation. Whoever the sponsor is, it should be remembered by all parties that the acceptance of the product that is being handed over is the ultimate weapon of the sponsor. Depending on the terms of the specific request, the task worker may not get paid if the product is not accepted. It would certainly not be a career enhancing action to hand over a product that is not of appropriate quality i.e. fit for the purpose for which it was intended.

So, although acceptance and the surrounding controls are really the sponsors responsibility it is in the task workers interest to ensure that the process goes as smoothly as possible and doesn't instigate later recriminations.

Evaluating the Right Thing

It should be emphasised, that the product should only be evaluated and hence accepted on the basis of the requirements that have been documented and agreed between the two parties.

One way that the worker or supplier can assist in this process, is to evaluate the requirements very early on during the task (and when every change request arrives), from the viewpoint of "How am I going to demonstrate that this has been achieved?"

This approach has a two fold benefit:

- If there are any ambiguities in the requirement, this approach should iron them out fairly quickly.

- If it is not possible to demonstrate any particular requirement then it could be that further investigation is required, as this indicates that a requirement is too vague.

It should also be noted that perfection is rarely possible, especially where software development is involved and agreement should be reached on the level of problems that are acceptable for hand over to take place prior to the start of the acceptance demonstration.

Untestable Requirements

Examples of some of the requirements that have been seen in Information Systems Requirements Specifications over the last few years:

- "The supplier will use the latest engineering techniques in the development of the system"
- "The system clock will be accurate to within one second in 100 years"
- "The system response to the operators will be very fast"
- "The system will be very easy for our operators to use and will be easy to maintain"
- "The supplier will guarantee that the system will never, under any circumstances cause user data to become corrupted"

Each of these requirements has an element that is neither testable nor demonstrable.

Discussion Question 4.13: Explore the above problems and suggest how these problems might be resolved. Choose **ONLY** two of the statements above and post your answer on the Discussion Board.

Evaluating in the Right Way

- Be prepared to be objective about defects and faults:
 - does it matter?
 - is the specification correct?
 - is it really a system fault?
- Work with the sponsor not against:
 - likely to be faults on both sides;
 - better to co operate, consider present and future requirements, and not to argue about the past.
- Apply configuration management to test documentation:
 - remember that the test documentation may be at fault if it needs correcting, ensure that the version number and date are updated.

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Planning Acceptance

- Select/define tests:
 - what is to be tested and how?
- Define completion criteria:
 - how much testing is enough?
- Estimate time scales and effort:
 - including preparing scripts, data, actual testing and potential retesting.
- Allocate resources:
 - responsibilities for test design, test running, problem resolution and final approval.



Types of Acceptance Tests

Some types of tests that can be performed on an Information System Development product:

- Correct function tests - does it do what it should?
- Correct response to feasible abnormal situations - when unusual or abnormal conditions occur, does the system behave as expected?
- Performance - does the system cope with extreme (low and high) levels of:
 - stress; volume; timing; capacity.
- Non functional *ility* tests *reliability*; *usability*; *maintainability*; etc.
- Configuration are all the correct bits or components present?
- Documentation (installation, user, maintenance) - is the documentation complete and usable by the intended reader?
- Alpha and beta testing - are alpha (in company use) testing or beta (other company use) testing appropriate?
- Human factors - does the system support or hinder the users perform their tasks?

Evaluation of Results

Be prepared for three options when the results of the acceptance are presented.

- Three possibilities:
 - Yes the product has passed without qualification
 - Yes, the product has passed, but with reservations
 - No, the product has not passed with reasons given

The first of these possibilities is the most unlikely there is nearly always something that needs to be amended.

- Reaching agreement not always easy
- Objectivity very important

It is very easy to feel victimised, when problems are found with the work performed but it is important to remain objective, and look for a constructive strategy to correct any problems encountered and move forward with the completion of the task.

Transition to Operation

This specifically relates to the development of an Information System Product.

One would hope that all of these topics will have been addressed prior to the end of the development but now is a good time to ensure that everything is in place, and the plans for the next stages following the development are in place,

- *Configuration management* of the product - what exactly does the sponsor accept?
- *Backup and archive* - have all the electronic files been archived, and are procedures in place for continuous back up of data?
- *Training of users* - have the users been trained and do they feel confident?
- *Handover* - will it be a "big bang" changeover, is there a pilot system for part of the product, or is there enough funds (and is it appropriate) for parallel running?

Ensure adequate maintenance procedures - the key question here - is WHO is to maintain the product and how?

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Maintenance

"What is Information System Maintenance?"

Discussion Question 4.14: Post your thoughts on the Discussion Board, before you proceed further.



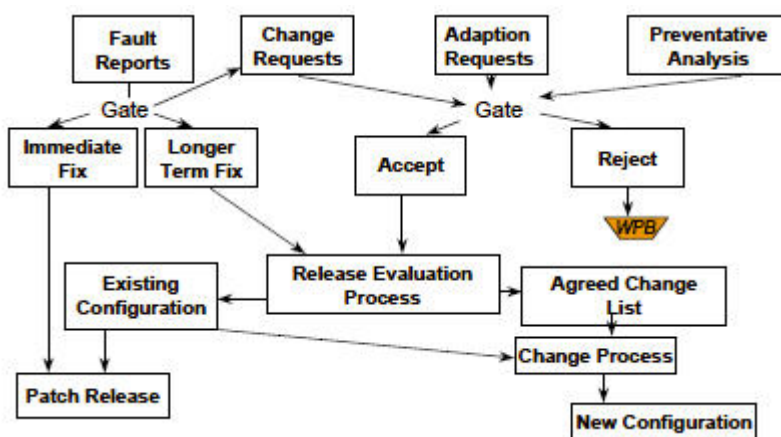
- Clearing faults? = **Corrective** Maintenance
- Adding new features? = **Perfective** Maintenance
- Adapting to a different environment? = **Adaptive** Maintenance
- Maintaining the integrity of the system? = **Preventative** Maintenance

One of the main issues with IS maintenance is the establishment of an appropriate contract, along with service level agreements to ensure that the system can be maintained within the users operational environment.

Each of these different types of maintenance need to be covered. This contract should be negotiated prior to handover and may indeed be issued to a third party.

Discussion Question 4.15: What do you think some of the issues are surrounding an in-house maintenance of a 3rd party developed software product. Post your thoughts on the Discussion Board.

A Process Model for Maintenance



The acronym WPB ~ **Waste Paper Bin!**

Controls and safeguards are necessary to retain the integrity of the product that is delivered.

- Each process must have its own control.
- The gates must be stringently controlled.
- Must have version control.
- Need appropriate fault removal and test procedures of any changes including regression testing, i.e., ensure that no faults have been introduced into other areas of the system.

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Mission Accomplished - Celebration or Commiseration ?

So, now the task has been completed, handed over and everything is set for maintaining the product (possibly outside of your responsibility) what do you do? Forget all about it?

Whether the project has been a great success, or a foot dragging failure, **completion is a good time to learn from the experience and build a foundation for future successes.**

It is often assumed that people learn from experience alone!

It would be more accurate to say that they can learn from the information that has been kept. With the exception of a few remarkable people human memory is only accurate over a very short period. It is important therefore to record history as it happens, in sufficient detail to reconstruct the order of events and the project status at the time. This is useful to keep in a project log that forms the basis of any post development analysis.

Unless the need to learn from past experience is recognised and accepted, the next project will repeat most, if not all, of the problems in the previous one.

A mandatory component of the *deliverables* of the project should be a post development review report that incorporates lessons learnt from the just completed project. The effort required producing a good report could be minimised if the project monitoring has undertaken ongoing analysis of data during the project.

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Gathering Data

Some projects hold a **project review** (post mortem) meeting at the end of the project. Others collect e mail summaries of what each project member thinks has worked or not worked.

Ideally, collect the project members' impressions about the project within 15-30 days of completion. After more time than that, project members begin to forget important insights and assembling or reconstructing end of project status data becomes more difficult.

Project Review Meeting

Project review meetings can be valuable times for team members to discuss their insights candidly, and those insights can be tremendously beneficial to the organisation.

To prevent the meeting degenerating into a gripe session, try and arrange for an independent, objective moderator is used. An objective moderator will make sure that all sides of each major issue are discussed and will keep the members from drowning in any single topic.

Ensure all interested parties invited, provide a summary of relevant information, and ensure that notes are documented and archived in a form that can be used by subsequent projects.



If a project log has been kept, providing information on which to base the discussions can be significantly easier.

Project Review Questionnaire

Some projects have had good experience of using a three part project review questionnaire.

- The first part contains numerical rankings of various project attributes:
 - "How would you rate the projects control over changing requirements of a scale of one to five, with one being too restrictive and five being too lax, and three being just right?"

This allows project members' subjective evaluations of the project to be compiled in a quasi-quantitative form.

- The second part of the questionnaire contains targeted questions about specific areas that might need

improvement. This part might need project specific questions such as:

- "We used a staged delivery approach for the first time on this project. In your opinion, how helpful was that in meeting our project's objectives? How could the approach be improved?"

The questions (and answers) in this part can be used to direct the discussion in the Review meeting if one is held as well.

- The third part of the questionnaire should include a free format comments area on the questionnaire,
 - as you will certainly not include specific questions on all the topics that the team members wish to comment on.

The lecturer could ask the students to devise a questionnaire that could be used on their current or previous projects.

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Project Log

Ideally, a log should be kept during each project or task but it is worth putting effort into creating a summary of the contents, and presenting it in a format that will be of use to future projects.

Discussion Question 4.16: What should the log comprise ? Post your thoughts to the Discussion Board.

It is important to put the information into context, and describe the original purpose of the project, and who the stakeholders were, and what their success criteria consisted of.

Describe the approach(es) taken to undertake the task or project, and the team that was involved, along with staffing levels.

Data that was collected, where possible be presented in graphical form.

Such data for an IS development project may comprise:

- Actuals for schedule and effort as of the release date.
- Size of product at release date (Lines of code, or number of modules).
- Defect or problem count as of the release date.
- Graph showing each schedule estimate compared to the actual schedule over time.
- Graph showing each effort estimate compared to the actual effort over time.
- Graph showing deliverable production over time.
- Graph showing outstanding and resolved defect count by week.

Lessons Learned

The project log should also contain a description of the lessons learned whilst undertaking the project or task:

- Planning
 - Were the plans useful? Did the team adhere to the plans? Was the quality of the project personnel sufficient? Were the number of personnel in each category sufficient?
- Requirements
 - Were the requirements clear and complete? Were they stable, or were there many changes? Were any changes managed effectively? Were they easy to understand, or were they misinterpreted?
- Development
 - How effective were the techniques, methods and tools used during development and test (if appropriate)?
- Risks
 - Was the risk assessment undertaken? Did any hazards occur that were not identified during the risk assessment? How effective were the risk reduction actions? Was it necessary to resort to contingency plans, and were they effective?
- New technology
 - What impacts did new technology have on costs, schedules and quality? Did managers, developers

and users interpret these impacts the same way?

Project History Conclusions

There is no point in doing all the above, if the output of the review is subsequently archived and forgotten.

Information must be fed into other projects, so that they can learn from your experiences.

All the recommendations for future practice need to be incorporated into checklists that are used on all projects.

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Case Study: London Ambulance Service

Download and read the [London Ambulance Service](#) case study and answer the following questions:

- What went wrong ?
- Why ?
- What should have been done ?

Post your answers in the [Case Study: London Ambulance Service - Discussion Board](#).

[Download the London Ambulance Case Study \(PDF file\)](#)

You will require Adobe Acrobat Reader to read this file

To get Acrobat Reader [click here](#)



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To summarize, the main issues are:

- It Is essential to retain good relations with the sponsor or purchaser.
- Maintain objectivity and don't let anything become personal.
- Be aware of both current and forthcoming.
- Last but not least learn from the experience don't throw it away!

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Links

[Project Management Glossary](#)

Task Management

Lesson 5 - Time Management

Time Management - Managing Your Time | Myths | Master Control System | Productivity Pyramid | Avoiding Interruptions | Too Much to Learn ? | Scheduling Time-Off

Time Management - Managing Meetings | Why Have Meetings ? | Before the Meeting | During the Meeting | After the Meeting

Time Management - Managing the Time of Others | Communicating Well | Understanding Information Flow | Understanding Delegation | Managing Colleagues | Managing Your Manager

Time Management - Managing Your Time

"It's been a hectic day as usual. The phone has rung at least two dozen times, I've attended 6 meetings, I couldn't begin to count the pieces of paper I've handled, I had 50 new email messages that arrived over the weekend, I've dealt with 4 queries from colleagues who unexpectedly arrived in my office, and there have been 2 major crises to sort out. I've been so busy but, you know, I don't really feel as if I have achieved anything."

Has this ever happened to you ?

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"How do they expect us to learn time management when every hour here feels like three hours, a week feels like a year, and the weekends fly by like ten minutes?"

One of the first tasks required in any time management program is an assessment of the current state.

Take a couple of minutes to prepare a Time Log of a typical day, recording for each activity or task:

- **time started**
- **activity undertaken**
- **pay off or value (low, medium or high)**
- **duration**
- **whether planned or not**

- *could the task have been delegated ?*

Reference to "Alesandrini, Survive Information Overload, JSBN 1 55623 721 9, Pub Irwin 1992"
may provide, useful further background to this session.

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Time Management Myths

"Focus on your goals and only the information relevant to them, then ignore the rest."

Information fuels knowledge, which is the lifeblood of the manager. That knowledge, however, must relate to the entire system; otherwise, the left hand doesn't know what the right hand is doing. Miss one key piece of information about your supplier, customer, competitor or emerging trend, and you risk not only productivity and success, but ultimately your business survival.

An accurate and useful view is necessarily a broad one.

"Don't waste time with unimportant people"

The seemingly unimportant person, whether an employee, customer, supplier, or even competitor, may prove pivotal to a firm's future success. If you act as though you believe this maxim, then those *unimportant* people will soon realise this, and make alternative arrangements for their comments or demands:

- An employee could become de-motivated and resign.
- A customer could take their business elsewhere.
- A supplier could stop providing your company with preferential terms.
- A competitor may take a joint venture proposal elsewhere.

"Place a 'Do Not Disturb' sign on your door to limit interruptions so you can be more productive"

Admittedly you do need some time with limited interruptions, but you must not forget that collaboration and effective team working are the key issues in productivity so investigate alternative solutions to handling interruptions.

"Carefully plan ahead and schedule your time on a daily basis"

If you plan your day to the smallest detail, then you will not achieve the majority of your planned tasks. Ensure that several sections of the day are unplanned to cater for the unexpected. If, by some chance, the unexpected doesn't happen, then make constructive use of the time by re allocating it to appropriately categorised tasks

"Never handle a piece of paper more than once"

Insisting on handling a piece of paper only once, means that everything needs to be dealt with as it appears. This is often not an effective use of time. Many items will cross your desk that need significant time to study, digest and deal with - these need to be categorised and scheduled for handling in suitable time slots.

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Master Control System

Just as an airline pilot uses a master control panel to monitor and fly an aeroplane consisting of many complex subsystems, you can keep track of yourself, your staff and your company with a **Master Control System (MCS)**.

It funnels an unmanageable collection of dates, times, numbers, names and other needed data into one centralised resource available at your finger tips.

An MCS may consist of anything from an individual time planner if properly used to a company wide

computerised Executive Information System.

What to do:

- Categorise your 12 most important activities these should include major projects; activities that you monitor; people with whom you deal; information that you need. Any area that consumes hours of your time on a weekly basis becomes a candidate for separate category.
- Funnel ALL important data through the MCS.
- Begin each category section with a top down view relating details to the major categories.
- Ensure that your files remain consistent with your MCS.
- Carry the MCS with you at all times.

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Use Appropriate Technology

Keeping a reliable and precise record of forthcoming events, appointments and obligations is crucial for efficient time management. There are many **different types of planners** available, so shop around to find the one that suits your needs best.



Remember only to have ONE SINGLE MASTER SOURCE!

The traditional way to record future plans by hand is in a diary.

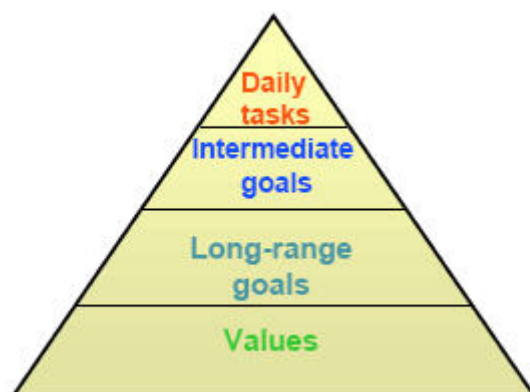
Increasingly sophisticated personal planners and electronic organisers, with address books and accounting systems are now available and are useful for keeping information to hand.

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The Productivity Pyramid

Ideally, everything you do should relate to your personal values. Visualising this relationship will help to improve your enthusiasm and effective use of time.

The goals that you set should not constrain you - rather be used to direct you and channel your life's activities into perspective.



Source: Franklin International

To optimise your effectiveness, you'll need to expand your perspective to see your work activities in a broad context. That perspective will allow you to distinguish between activities that contribute to your effectiveness and those that should be delegated or eliminated.

Expanding your perspective is a matter of reviewing in your mind what your work is all about. How does each activity relate to your major goals and priorities? What tasks really matter in your department, your company, your

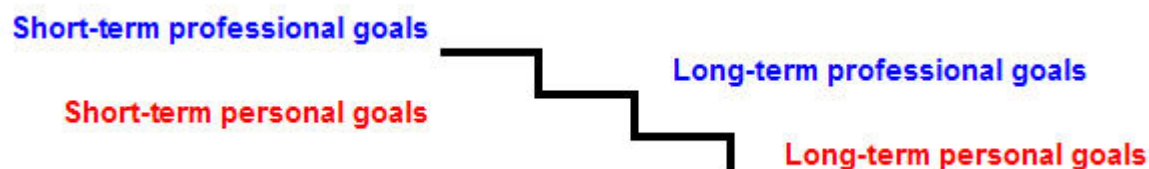
industry:

You should give highest priority to activities that:

- matter most to your department, company, industry and customers; and
- follow from your vision and contribute most toward the attainment of your main goals.

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Setting and Balancing Goals



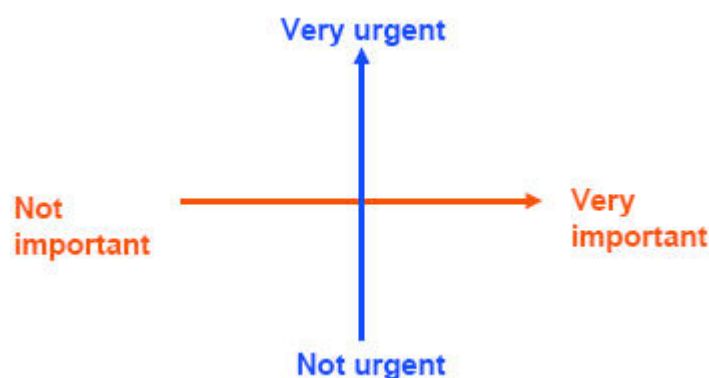
Long term personal and professional goals are essential when it comes to setting overall targets, but in the short term a personal goal, such as starting a family, may take temporary precedence over long term aims such as running a business.

Take a couple of minutes to document your goals in each of these 4 dimensions, giving skills required where not already present. Finally, set a timetable, as when you would like to achieve each of your goals.

Use of flowcharting techniques could be made especially when planning career related goals as this will help identify short and long term options, and the values placed on the different goals.

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Priorities Axis



In order to work out priorities, it is essential to understand the distinction between importance and urgency, and to use both dimensions when assessing when a task should be undertaken..

Take a couple of minutes to chart on the above graph, all the tasks that you documented in your assessment of a typical day at the beginning of the session. Then, develop a current to do list and plot each of these items on a separate graph.

Remember that the priorities of the different stakeholders in your tasks may not be the same as your own and you may need to consult with all the stakeholders before plotting the tasks on the graph.

- The **top right** hand quadrant should obviously be allocated the **highest priority**.
- 'The **top left** hand and **bottom right** hand quadrants may be **where there is the greatest conflict and input** from other stakeholders may be required.
- The **bottom left** hand quadrant **tasks should be performed last** if indeed they are needed at all.

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Too Much Paperwork

A TON of Paperwork does Cross your Desk!

A survey (1992) in the United States claimed that:

- the US uses 22.8 million tons of office paper annually, which amounts to over one tone for every executive, administrator and manager in the work force;
 - demand for office paper has grown twice as fast as the gross national product for the last 10 years;
 - over 60 billion pieces of third class or junk mail weighing 4 million tons are sent each year, amounting to 41 pounds for each adult American;
 - the best way to handle paperwork is to eliminate the need for it altogether. Convert it where appropriate and possible into electronic paper. Where not appropriate or possible ensure that it is quickly categorised and colour coded and filed;
- the aim should not be for a paperless office, because that worn out notion misses the point. **Today's office needs a variety of information media, including paper. It's time office workers put paper in its place and turned to electronic media for many, if not most, information needs.**



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Avoiding Interruptions

Assess source of interruption - how many interruptions are made by whom, and using what media

Assess how much the telephone interrupts, How many:

- unexpected calls received?
- unwanted calls received?
- calls lasted longer than necessary?
- calls could have been dealt with by someone else?
- calls interrupted me?
- calls could have been screened out?



Rethink workspace - to make your desk less inviting, when you do not wish to be disturbed - do not sit down if you are followed into your office.

Discussion Quesiton 5.1: Do you have any techniques to avoid and control interruptions in various circumstances. Post 3 techniques on the Discussion Board.

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Managing Outgoing Calls

There is hardly a business in existence that does not depend on the phone and, increasingly, voice mail for rapid and direct communications.

Set aside a specific time of day for making phone calls, and list all the calls that you need to make.

Be clear about the purpose of each call, and draw up a brief agenda for each as if the call was a meeting, and then make sure that you cover all the items on the agenda during the conversation.

Prioritize your calls in order of importance to ensure that you concentrate your time and resources on the most important and urgent calls.

Ensure that any use of voice mail is made appropriately.

Voice mail is an ideal tool for arranging internal meetings or eliciting a simple response from a busy colleague.

But, avoid bargaining or making deals by means of seemingly endless series of voice mail messages, since you need to speak directly to customers and suppliers to gauge reactions and find areas of compromise and agreement.

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Managing Incoming Calls

Techniques for managing incoming calls include:

- Put phone on divert when busy or in meetings.
- Set aside a quiet hour during which we will not take calls.
- Arrange for calls to be screened whenever possible.
- Make appropriate use of telephone messaging services (always make sure that your personal message is up to date).
- Be polite and brief with unwanted callers.
- Ask people to call at particular times when we are less busy.
- Avoid taking notes on loose bits of paper.
- Avoid tackling peripheral tasks while on the phone.
- Ask the receptionist not to give out names to cold callers.
- Make a list of excuses for keeping calls short.



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Too Much to Learn ?

Step 1: [Assess your learning style?](#)

Step 2: [Use appropriate strategies to help you learn](#)

Step 3: [Learn collaboratively](#)

People have different learning styles: verbal and visual

Discussion Question 5.2: Take a moment and think about, Which category do you fit in ? and Which techniques do you learn from most effectively ? Post your answers on the Discussion Board, let's see how each one of you differ in your learning styles ?

Information chunking and visualizing techniques to assist in memory recall and conceptual understanding.

Information Chunking

- Principle:
 - All information should be presented in small digestible units.
- Digestible unit defined:
 - A digestible unit of information contains no more than nine separate items of information.
- Rationale:
 - Research suggests that human beings can understand and remember no more than seven plus or minus two items of information at a time. This phenomenon is called the "chunking limit". Further, as the complexity of the information increases the chunking limit decreases.
- Lessons learned:
 - All information intended for human consumption should be presented in units that do not exceed the chunking limit. This principle can be applied to:
 - Written documents
 - Object, data, functional and dynamic models
 - Computer programs

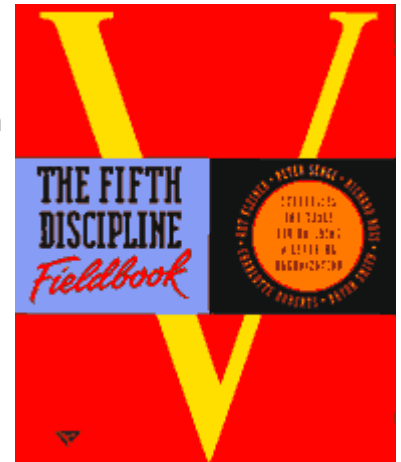
- Benefits:
 - By chunking information the author improves the reader's comprehension and ability to access and retrieve the information.
 - Examples:
 - No more than nine bullet points on a slide

Structuring information so it will fit into the "bigger picture" and then generating analogies for each new item, this assists in the ability to learn.



Peter Senge, author of "The Fifth Discipline" believes that team learning is vital element of the modern organization. He recommends:

- Assess the needs and capabilities of the individuals.
- Establish the goals as a team.
- Discuss ideas, ask questions and provide feedback to others in the team.



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Scheduling Time Off

Managing your time successfully involves more than just organising your workload.

Work will suffer if you do not schedule regular breaks to recharge your batteries.

How many hours per day/week/month do you allocate to leisure time?

Some business leaders include a regular period in their day when they briefly take time off. Similar to the siesta, it is often taken after lunch. Their doors are shut to interruptions, allowing them to take a short period of semi-sleep (only about 10 minutes), which has a recuperative effect on the body.

Exercise helps to reduce stress and can provide a useful break from work if your workplace has showers and changing facilities.

Regard, holidays and time off work as a good exercise in delegation to colleagues

Taking time off should not make you feel guilty - it will help you be more effective in your work.

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Time Management - Managing Meetings

As meetings consume a large proportion of the average working week, this session is dedicated to looking at the issues of meetings and how to make effective use of them. Discussions will include items such as:

- Why do meetings go wrong?
- What to do before meetings?
- What to do during meetings?
- What to do after meetings?

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Why Have Meetings ?

Discussion Question 5.3: "Why have Meetings ?", post your reasons for having meetings on the Discussion Board.



Different types of meeting include:

Reasons and objectives for holding meetings:

- Transfer information and receive feedback.
- Generate new ideas.
- Build consensus for a decision or course of action.
- Combine expertise to solve problems.
- One to one discussion, interview or performance assessment
- Project progress meetings
- Team briefings
- Document or product review meetings
- Budget setting meetings
- Board meetings
- Conferences

Discussion Question 5.4: What proportion of your time is spent in meetings? Post your answer in the Discussion Board.

What proportion of time spent in meetings is wasted?

Explore the following areas:

- How much did the meetings cost?
- Were the costs of attending the meetings greater than the benefits gained?
- Were the meetings adequately planned?
- How many meetings were delayed because of late comers?
- Did the meetings frequently last longer than expected?
- Were there problems with equipment and facilities?
- Did each participant make worthwhile contributions?
- Did the meetings tend to wander away from the objectives?
- Were decisions taken during the meeting followed up?
- Any other pitfalls identified?

Discussion Question 5.5: Post three scenarios that fit some of the points presented above, in the Discussion Board.

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Before the Meeting

CHAIR	ATTENDEE
--------------	-----------------

The chairperson should work from a **standard** checklist to ensure that all meetings are coordinated and run effectively.

A checklist could include:

- Is the meeting really necessary?
- What are the alternatives to meeting face to face?
- What are the objectives of the meeting?
- Who is needed to ensure that these objectives are achieved?
- What will be the pay off from achieving the objectives?
- What will the meeting cost?
- What equipment/facilities are needed for the meeting'?
- If an agenda is required has it been prepared/distributed?
- Are all the attendees clear about the start time and the location of the meeting?
- Have attendees received all the relevant background information?
- Do all the participants need to be present for the whole meeting'?

Once the meeting's purpose and objectives are defined - we need to be ask what the pay-off from achieving each objective will be. The pay-offs will enable us to prioritise the agenda and focus on the important items. The total meeting pay-off should be weighed against the meeting cost to see if it is a worthwhile exercise.

The agenda items should be positive and achievement oriented, i.e., "To find a solution to the distribution problem", rather than "To discuss distribution problems."

A checklist can also be useful to the meeting attendees.



A checklist could look like:

- Do I really need to attend the meeting?
- Is there an alternative to the meeting?
- Am I sure of the correct time/location of the meeting?
- Have I arranged my schedule so that I will get to the meeting on time? What do I want to contribute to the meeting?
- What do I want to get out of the meeting?
- What background paperwork do I need to tackle?
- Do I need to attend all of the meeting or just part of it?



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During the Meeting


CHAIR	ATTENDEE
<p>The chair has a difficult job, not only to see that objectives of the meeting are achieved and followed through, but also to ensure that any destructive forces are kept to a minimum and dealt with appropriately.</p> <p>The checklist could include:</p> <ul style="list-style-type: none"> • Always start on time. • Set out the objectives of the meeting. • Stay positive throughout the meeting. • Follow up actions from the last meeting. • Decide who will take the minutes. • Encourage participation from reserved attendees. • Silence side-trackers. • Keep the discussion focused on the agenda. • Adhere strictly to the agenda timetable. • Summarize decisions/actions to be taken as the meeting progresses, and again at the end. • Ensure that all the items on the agenda are covered. 	<p>As participants at meetings, we should always try to be constructive.</p> <p>If we act counter productively, we are wasting our own time as well as that of the other participants.</p> <p>The attendees checklist may look something like:</p> <ul style="list-style-type: none"> • Contribute constructively to the meeting. • Restrict contributions to agenda items. • Focus on the meeting objectives. • Be clear about any follow up actions or steps to take. • Avoid private discussions during the meeting.

- Finish the meeting on time.

Discussion Question 5.6: How would you deal with some of the destructive elements listed above. Post at least 2 ways to the Discussion Board.

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After the Meeting

CHAIR	ATTENDEE
<p>What happens after the meeting, ultimately determines whether or not the meeting has been a success.</p> <p>As soon as the meeting is over, the chairperson should quickly work through his checklist. In certain circumstances, it can be useful to evaluate the meeting with the participants.</p> <p>The close-out checklist for the chairperson could include:</p> <ul style="list-style-type: none"> • Has the meeting been a success? • Were the right participants present? • Were all the items on the agenda covered? • How should unfinished items be dealt with? • Do I need to distribute meeting minutes and who to? • What should I do differently next time? • Could we have achieved the same results without a meeting? 	<p>After the meeting, the attendees should immediately transfer actions to their to do lists, and run down their own checklist.</p> <p>Such a checklist could include:</p> <ul style="list-style-type: none"> • Was my participation in the meeting really necessary? • Am I clear about any follow up actions I need to take? • Did I contribute constructively to the meeting? • What should I do differently next time? 

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Time Management - Managing the Time of Others

To make the best use of your time, you also have to manage that of your staff, colleagues and seniors. Learn to delegate well, share tasks and manage upwards as well as down.

Delegation is the art of getting things done through others.

As we progress through our careers, we will find it necessary to rely more and more on our colleagues to get things done for us. Many managers fear delegation and the loss of control it brings, but it is essential to free up our own time for higher pay-off activities.

In this session we will study issues specifically relating to delegation, but include pointers and extracts from elsewhere in the course, as this topic requires the use of skills that are discussed in many of the other sessions. These include: human communications, estimation, progress monitoring, managing meetings and handling interruptions.

Discussion Question 5.7: "What influence do you have on others' time ?", and "how effective do you believe you are currently in achieving your objectives when dealing with others ?" Post your answers to the Discussion Board.

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Communicating Well

To manage others so that you all make the best use of available time, you first need to **master the art of**

communication.

This is not just a matter of deciding what your message is; it is also about deciding **how to communicate that message**.

Intranets and email systems allow rapid widespread dissemination of information. They can also make working at home without losing touch with colleagues a more practical and attractive option that it used to be.

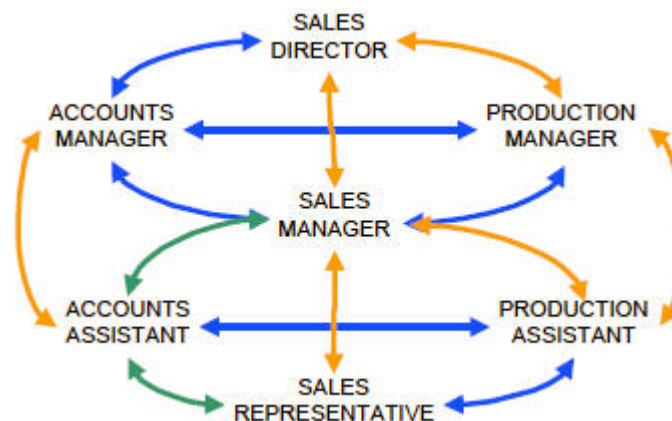
However, beware of information overload: the volume of data may make what is effectively junk email seem more important than it is, and the ease of electronic communication can make it tempting to send messages that are not strictly necessary.

Remember too that as organisations become less hierarchical, and lines of communication open out, recipients may lack necessary background information, so always be clear and precise to avoid time wasting misunderstandings.

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Understand Information Flow

Certain communication lines in any organisation are better developed than others. For instance sales staff spend more time in contact with the production department than with colleagues in administration.



On the above diagram:

- the orange connectors indicate frequent communication
- the blue connectors indicate occasional communication
- the green connectors indicate rare communication.

Discussion Question 5.8: Using Word, draw up the flows that are present in your own organization, and indicate the frequency of communication. Also identify what mode is used for most of the communication meetings, telephone, fax, email, memo etc. Post a message on the Discussion Board and then attach the Word document.

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Understanding Delegation

A clear and straight forward definition of delegation is:

It is the process of passing certain tasks and duties from one person to another, typically a superior to a subordinate. The delegate receives sufficient authority to complete the work satisfactorily, although the delegator retains overall responsibility for its success or failure,

Advantages

Obviously, delegating work to others will free part of your time, so allowing you to concentrate your skills and efforts on more urgent or important matters.

It should also develop your subordinates' capabilities, increasing their confidence and stature, and providing greater job satisfaction.

New ideas and approaches to old methods may be found too.

It can build morale and motivate everyone within the team, if they know that you are willing to give them room to grow, be more successful and progress through their careers.

Disadvantages

Most of the drawbacks of delegation arise simply because it is not done wholeheartedly or properly.

Most notably, the delegator hands over work but not authority, because he or she is frightened of letting go. Perhaps he or she will not be needed any more. Possibly, the delegate will do a faster and better job. So the delegator constantly interferes and checks what is being done, creating ill feeling and wasting (two people's) time.

Often only the duller or the most unpleasant tasks are passed on, which again causes resentment.

Also the delegator sometimes chooses the wrong employees to do the work regardless of whether or not he or she is capable and willing.

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Are You Delegating Well ?

	Never	Sometimes	Often	Always
Do you think your subordinates lack ability?				
Do you believe it is quicker to do everything yourself?				
Do you like to be seen as overworked?				
Are you reluctant to hand over tasks?				
Do you just pass on routine activities?				
Do you keep the most enjoyable tasks yourself?				
Do you tell delegates to report back every step of the way?				
Do you continually check up on delegates?				
Do delegates ask you what they are supposed to be doing?				
Do delegates get angry with you?				
Do you have to complete the delegated activities yourself ?				

What do you think the answers should be ?

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Delegating Choices

The process of delegation comprises of: the decision to delegate, the briefing and the follow up. At each of these points, anticipate the potential problems.

- **The decision:**
 - You will not benefit if you work to the assumption that it takes longer to teach somebody else to do a

job than to do it yourself.

- You must persuade yourself to delegate.
- Delegation has its own rewards - once someone has learned to perform a particular task, they will be able to do it in the future without repeated briefings.
- However, be sure to delegate each job to a person with appropriate skills and knowledge - depending upon how much time you currently have to assist them in performing the task.
- **The briefing:**
 - Make sure that the person to whom you are delegating clearly understands the brief what you want them to do and by when.
 - Offer ongoing support and guidance.
- **The follow up:**
 - During the course of the project, check the standard of work produced.
 - Provide positive feedback, but beware of overdoing it there is a narrow line between helpful supervision and debilitating interference

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Delegating - Key Points

- In addition to providing a clear brief when delegating, you must provide all the information necessary for someone to complete the task successfully. To avoid any misinterpretation of the facts, take time to explain exactly what you expect, and how the task fits into your overall plan.
- Try and obtain agreement on when the task will be completed, rather than imposing an unrealistic deadline. Request that one of the first actions undertaken is the delegate's own estimate and plan of completion of task if necessary providing guidance on how to estimate effort, duration and do the detailed planning.
- Ensure that any feedback given is *positive*, even if problems have occurred. If problems persist, then encourage the delegate to undertake further professional development and organise training sessions.

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Managing Colleagues

One of the most difficult things to get right is managing interruptions from colleagues.

Either you become too available to each other, in which case you lose control of your time, or you are too distant and fail to take advantage of each other's abilities.

Traditional corporate hierarchies are gradually being flattened, and more tasks are now being assigned to teams designed and brought together for one-off projects. This means that you need to be able to work side-by-side with a variety of individuals and find ways of agreeing with them about work priorities and time management.

A good time saving habit for you and your colleagues to get into is always to ask yourselves what you expect when you meet to discuss an issue.

A useful mnemonic - AID - that helps in classifying the options available to you.

Is it ADVICE you need from each other, is it INFORMATION, or is it a DECISION ?

At the beginning of a discussion, indicate exactly what you are looking for from each other and you will all be more aware of the demands that the exchange will make on your time.

The unique thing about most colleagues, is that they can give you dispassionate, on the job feedback, which you often cannot get from further up or lower down the organisational hierarchy. Unlike colleagues, seniors and subordinates may think too much in terms of job assessments. Listen to their advice, and adopt any useful time-saving techniques.

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Share your Time Management Skills

Share your time management skills with your colleagues

Prioritize work:

- Talk through the principles of dividing work into high, medium and low priority tasks.
- Use examples from your colleagues' workload.

Using diaries and planners:

- Ask your colleagues to keep a time log, then review and analyse it with them to discover their various working patterns.
- Help your Colleagues to set up an appropriate planning system.

Filtering information:

- Encourage your colleagues to assess every item of information they receive to decide what action is required.
- Provide hints on faster reading based on your own experience.

Delegating and following up:

- Discuss specific, related examples from the past to determine the best course of action in this instance.
- Be prepared to review any new systems that are set up.

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Managing Your Manager

Everyone should know how to manage their managers if they want to be able to make the best possible use of their own time.

Learn to do this discreetly so that your seniors do not feel as though they are being undermined or manipulated.

On the Discussion Board the following topics are present:

- How to build a professional relationship with your manager ?
- Communication's Do's and Don'ts
- When it is appropriate to "get your own way and how?"

Post your thoughts for each of these topics.

When needing to offer advice remember the AID mnemonic.

Is it **ADVICE** you need from each other, is it **INFORMATION**, or is it a **DECISION** ?

It is often possible to influence your boss to make a different decision to the one he or she was going to make.

Remember though that there may be reasons behind a decision of which you are unaware.

Discussion Question 5.9: What strategies would you adopt when a new manager is appointed over you, to ensure as far as possible a smooth transition and effective continuation of current work ? Post your thoughts on the Discussion Board.

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Remember that time is perfectly democratic.

Nobody has more or less of it than YOU !

Read Chapter 6 of the textbook Management Organizational Behaviour

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Links

[Project Management Glossary](#)

Task Management

Lesson 6 - Introduction to Human Communications

Introduction to Human Communications | Objectives | Successful Communication | Communication Filters | Medium | Audience | Communication Time | Receiving Communication | Communication Dynamics | Barriers to Communication | Preparation

Human Communications - Listening Skills | Hearing versus Listening | The Process | Different Types | Active Listening | Non-Verbal Communication | Facial Expressions | Contradictory Signals | Improve Your Listening

Introduction to Human Communications

A good introduction to Human Communication is to perform the following exercise during our chat session.

Chat Exercise 6.1: During the chat session, the instructor will describe a specific drawing. The remaining students should attempt to draw what is being described. Please keep a paper and pencil next to you before the chat session for this exercise

The **students** can ask questions that may help them in drawing but only those questions to which there are **YES** and **NO** answers.

At the end, the instructor will show the students the drawing. Students will compare their drawings to the original.

To conclude the exercise, students must answer the following, "what did you find difficult about the exercise and why ?"

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The ability to communicate effectively is an essential part of being an IT Professional.

Good communication skills are needed for many tasks including eliciting requirements for systems, briefing team members, demonstrating products, presenting to prospective clients, and interviewing for staff.

Principles of Human Communications cover all the above topics, and include an important core competence required for all of them Listening.

It is recommended that throughout all these sessions, time is set aside for "practice listening", where the students (in groups of 3 talker, listener and observer) take turns to listen to each other talk for 5 minutes on a topic of their own choice. The listener should be able to recount the important points made (without taking notes), the talker should comment on whether they had been attended to, and the observer is able to provide comment on the interaction, and listening techniques.

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Objectives of Communication

When communicating, it is important to recognise why you are doing so. If there is no reason, then it is likely you are wasting time.

All communication is targeted at four objectives. These are:

- If a message is not **received** all subsequent actions can not be followed.
- A message must be **understandable** in the context in which it is given.
- After being understood, the message must be **accepted**.
- All messages should provoke an **action**, even if this is only feedback that a piece of information has been understood by the recipient.



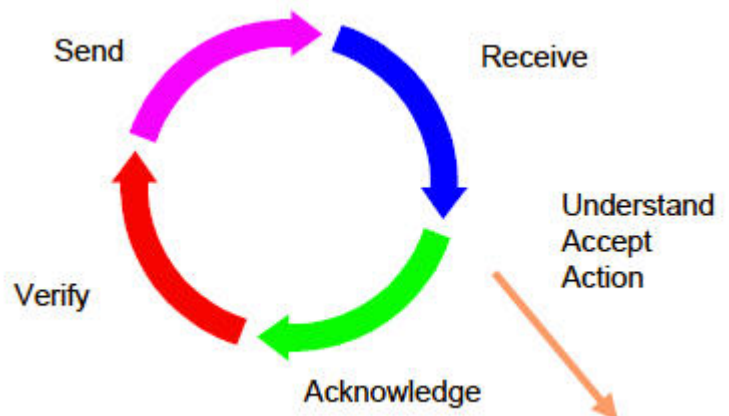
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Successful Communication

This cycle of activities is often used to describe the process of communication indicating...

we send a message, which the recipient receives, and as well as understanding, accepting and performing any action required,

also completes the cycle with some form of acknowledgement which provides verification that the communication has been successful.



This however is a simplification, and it is that simplification which cloaks the difficulty in communication that we must overcome if our communications are truly to be successful.

As we can see from this amended diagram, as each person involved attempts

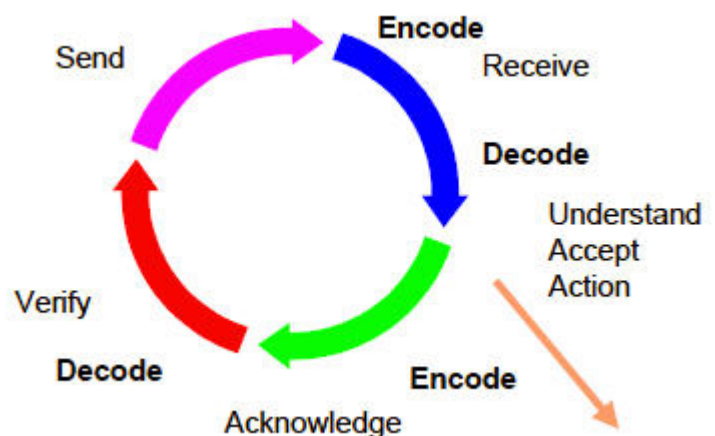
to send a message they must first encode the message in the medium they have chosen: verbal, written, body language etc.

Similarly each receiver must decode the message prior to attempting to understand the message.

Likewise, the acknowledgement is first encoded by the receiver, before being transmitted to the sender for decoding.

It is within these encoding and decoding sequences that many problems with communication occur.

The coding is often performed through filters which are context and environment dependent.



Discussion Board 6.1: Post your thoughts on the positive and negative aspects of communication via a telephone and Chat Room.

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Communication Filters



Any one of these filters could affect and potentially alter the meaning of a message as it is received.

It is important that the communicator is aware of the potential pitfalls, and makes appropriate amendments to the content and medium of message.

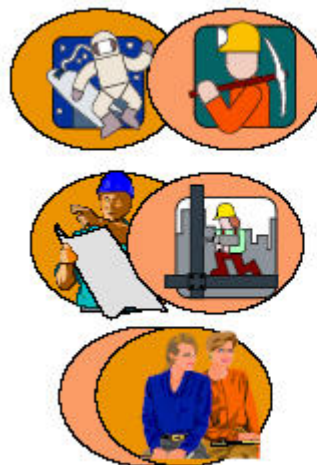
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Experience Filters

When we have a **high level of shared experience** we have a common understanding of the meaning of words, so jargon words have their special meaning for both the sender and the receiver.

The **less shared experience** the smaller the zone, in which we can communicate effectively.

As long as we recognize the danger, it is not too difficult to manage it, however problems arise when assumptions are made.



Little shared experience

Average shared experience

Much shared experience

In an IT context the client, say an accountant assumes that we understand income tax legislation and that we understand his requirements.

We as the IT professional are often too afraid to demonstrate our ignorance by asking for clarification.

This also applies in reverse.

In order to perform the acknowledge process, we translate the system into Computer Design Jargon and present this back to the client, expecting him to understand a description of his system expressed in a language suited for the next level of design decomposition.

The client again is often afraid to demonstrate ignorance and hence errors occur.

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Language Filters

By language we are not referring to the difference between English, Chinese, Malaysian or whatever, but to that which is often a subtle and more insidious difference.

These differences occur when we think we understand the other person, but in fact our experiences differ to an extent that my understanding of a word is significantly different from the next persons.

Consider the word, "smack":

In the context of the Oxford English Dictionary, a smack is either a slap, to have a flavor of something or a single masted boat

and we would decide which definition is correct from the context in which the word is taken;

However, it is also a slang word for a type of drug,

so if one were involved in the drug culture, the word smack would be interpreted as that.

Take a couple of minutes to look up each of these words...

	1st Meaning	2nd Meaning
smack	a slap	a slang word meaning a type of drug
shotgun		
rose		
wealth		
education		
horse		
danger		

One further example,

an American might ask for the **check** and pay it with some **bills**,

while a Britain might ask for the **bill** and pay with a **cheque**.

In both cases the person is determining how much something costs and is paying for it.

Both are speaking a common language, English.

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Cultural Filters

Consider some of the following examples at the cultural level:

- **Shaking of the Head**
 - In most western cultures the shaking of the head from side to side is, almost universally, interpreted as no, however in some other cultures the same movement means yes.
- **Eye Contact**
 - In some cultures maintaining eye contact is normal, in others it is extremely bad manners.
- **Yes**
 - In some languages, the word for NO sounds very much like YES.
- **Holding Hands**
 - In some cultures men holding hands in public is normal, in others it takes on a sexual connotation and can be seen as provocative.



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Medium

With current technology, there is an ever increasing choice of medium for the transmission of the message, each with properties which make it appropriate for a given set of circumstances,

Written	Verbal
<ul style="list-style-type: none"> • letter • fax • email • report • manual • internet / intranet / extranet 	<ul style="list-style-type: none"> • face-to-face • telephone • teleconference • presentation • audio / video tape

As a class exercise, students should be asked to make a list of three advantages and three disadvantages relating to each of the media listed on visual. These should be discussed before proceeding to the next visual.

Discussion Quesiton 6.2: Each student must chose one written and one verbal medium and list three (3) advantages and three (3) disadvantages relating to the medium choosen. Each student must do a different medium, so you must read each others lists to make sure you don't duplicate. Post onto the Discussion Board.

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Which Medium ?

Which medium is better to use ?

There are many aspects related to the type of medium to use, although some of them will be more significant than others for instance,

a complex idea may be helped by a face to face opportunity for questioning and interaction;

a verbal presentation given on videotape will not allow feedback;

it is arguable that e-mail can offer most of the speed and other advantages of a verbal message, etc.

fast **lower importance**
greater importance
permanence **informal**
recorded **easy to control**
slow
instant feedback
repeatable
formal **impermanence**
fast verification

The question of accuracy in terms of completion of the communications cycle is complex.

Written communication can be revised and validated before and after transmission, whereas verbal communication is immediate and often spontaneous, and thus much harder to validate.

However the instant opportunity for feedback offered by verbal transmission means that the accuracy of its reception can be checked immediately and errors corrected straightaway; it may take a considerable time to feed back understanding in written communications with the result that errors may not be corrected until too late.

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Audience

By far the single most important critical success factor in human commiunication is simply *knowledge of the audience*.



Whether this is a single person or a group, the sender can never know too much about the receiver.



- Are they all alike or mixed?
- What do they:
 - already know ?
 - want to know ?
 - need to know ?
- What are their attitudes to:
 - Subject ?
 - Communicator ?
- In what context is the information received?



What are their priorities?

Based on the answers to these questions we will decide on the language and medium to use, it could be a mixture of both written and verbal to combine benefits of both.

We will also decide the method for communication and the environment in which we want to deliver the message. For example, will we just talk loudly in an open plan office or set up a lecture theatre; and how will we organise the seating in the room if we are going to do a presentation?

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Audience Types

Audiences are not always hostile or reluctant to receive a message but if the sender consistently refuses to take care to make sure that the communication method and medium are appropriate, they will soon become so!

Different people exhibit a range of preferences in terms of the way they receive messages. Broadly speaking, there are four types of receiver preference, and each communication should be targeted to address these preferences. If necessary, this could mean that the message has to be communicated differently to different people.



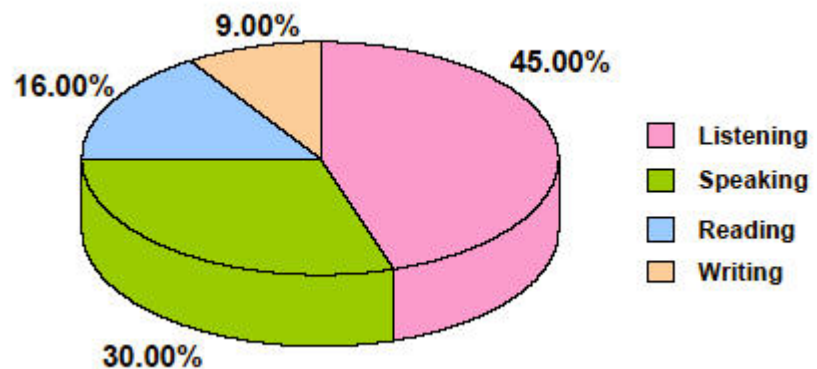
Discussion Question 6.3: Take a look at the above pictures and decide what type of person you are. Post your thoughts on the Discussion Board.

Percentage of Communication Time

Good communication is a two way process, and it would be true to say that a person will never be a good communicator unless he/she is also a **good listener**.

The importance of this is reinforced by the figures shown; **nearly half of communication time is spent listening**, and this is by far the biggest percentage of the means by which information is received.

It is therefore necessary to strive to improve these receiving skills whenever possible.



Receiving Communication - Listening / Reading

Active listening and active reading means that the receiver should be just as aware of the barriers to communication as is the sender.

Everything said earlier also applies to the receiver, who should accept a shared level of responsibility for good communication. (Although it is important that the sender does not see this as an opportunity to excuse a lack of care on his/her part.)

There are some key listening points that need to be practised until they become second nature:

- Find areas of mutual interest
- Ignore "political correctness"
- Hold your fire
- Listen for ideas
- Hear the sender's language
- Work at it
- Judge content not delivery
- Be flexible
- Use non verbal observation
- Exercise your mind
- Resist distractions

... and listen to the silence

Listening to the silence is perhaps the most difficult task in this - but sometimes the things which are not said are just as important as those things which are.

Take a moment and think about how you listen, and what percentage of your time is spent listening.

Communication Dynamics

Communicating a message can often be more effective

if you lead the recipient of the message..

to come to the conclusion himself
and that way obtaining "buy in" to the concepts given,
rather than giving a "thou shalt do" ultimatum type message.




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Barriers to Communication

Filters occur all the time, even when individuals wish to communicate effectively.

Barriers, however, occur when there is often a subconscious wish NOT to communicate, or to receive a communication.

Some barriers are listed here the lecturer may wish to discuss the impact of some of these barriers, and how one might overcome them.

- **Assumptions / Stereotyping** - if the receiver has an opinion (either positive or negative) of the sender based on previous communications and the importance of previous messages, this will lead to assumptions that the next message will be at a similar level.
 - **Inexperience / Lack of Knowledge** - when either of the parties has a significantly different level of knowledge or experience, mutual assumptions will be likely and these will not necessarily be compatible.
 - **Incompatible Objectives** - when the overall objectives of the sender and receiver are not the same, unintentional misunderstanding will be probable "a man hears what he wants to hear and disregards the rest".
- 
- **Attitude to the Sender / Lack of Interest** - if the receiver does not see what benefit there is to him/her from receiving the message, or if they feel that the sender is unimportant or much less senior, they are not as likely to give the requisite level of importance to the message.
 - **Time / Place / Mood** - people do not exhibit consistent behaviour in terms of message reception this will vary according to several factors such as time of day, the physical location of the reception, and certainly the mood of the receiver will govern his/her reaction to it.
 - **Noise (Cumulative Loss)** - the more times a message is repeated, the more its content will degenerate and the original meaning lost. This is reminiscent of the children's game 'Chinese Whispers' where a sentence is whispered into one child's ear, and passed from child to child; at the end of the chain, the message will be found to have changed completely.
 - **Overload / Redundancy** - if too much information is transmitted, the receiver will be overloaded; particularly when the message contains much redundant information, the significant element may be disguised and lost.

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Crisis Communication

Often when all the best practice goes out of the window - it is during a crisis scenario.

In these circumstances it is worth highlighting a short simple set of DOs and DON'Ts that should be imprinted into

the sub-conscious memory for automatic recall.

DO	DON'T
<ul style="list-style-type: none"> • Be prepared for trouble • Involve senior management • Issue regular updates • Tell the truth • Demonstrate concern 	<ul style="list-style-type: none"> • Blame anyone for anything • Speculate in public • Decline to answer • Release confidential information • Play favourites

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Preparation

So to conclude, it is important to be aware of the importance of preparation when undertaking a communication of any kind.

Planning and forethought can counteract many of the pitfalls that have been discussed.

- What is the message that is to be communicated?
- Should it be communicated verbally or in writing?
- Which communication method should I use?
- What are the potential problems and how am I going to minimise the risk of them affecting this communication?

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I keep six honest serving men

They taught me all I knew

Their names are What ? and Why ? and When ?

And How ? and Where ? and Who ?

What do I need to communicate?
 Why do I need to communicate it?
 When do I need to communicate it?
 How do I need to communicate it?
 Where do I need to communicate it?
 Whom do I need to communicate it to?

Discussion Question 6.4: Assess your own communication skills, identifying your strengths and areas for improvement and then prepare an action plan on how you can continue to improve your skills through the remainder of your professional career. Post your action plan on the Discussion Board.

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Human Communications - Listening Skills

Listening is a core competence. People who cannot listen cannot relate.

Nichols and Stevens (1957) in "Are You Listening" published by McGraw Hill,

estimate that 45% of all communication time is spent listening

compared with 30% speaking, 16% reading and 9% writing.

Despite the fact that people spend so much time listening, few ever receive any formal training on how to listen effectively. Poor listening undermines the ability to communicate with others.

The theory of listening skills will be discussed, but it is essential, that time is spent by trying to put these theories into practice, throughout the lesson.

This practice should take the form of students (in groups of three - talker, listener and observer) taking turns to listen to each other for 5 minutes on a topic of their own choice:

- The listener should be able to recount the important points made (without taking notes).
- The talker should comment on whether they had been attended to.
- The observer is able to provide comment on the interaction, and listening techniques used.



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Hearing versus Listening

Listening involves more than just hearing what is being said. Drakeford, in his book "The Awesome Power of the listening Ear" published by World Books in 1967, differentiates between hearing and listening:

Hearing

Physiological sensory process by which auditory sensations are received by the ears and transmitted to the brain

Listening

Complex psychological procedure involving interpreting and understanding the significance of the sensory experience

Listening involves the search for a full and accurate understanding of the meaning of another's message. It involves more than merely attending to verbal messages. To be a good listener, a person has to be able to "read" both verbal and non-verbal messages.

In this session we are going to look at listening to both verbal and non-verbal messages.

Do this exercise:

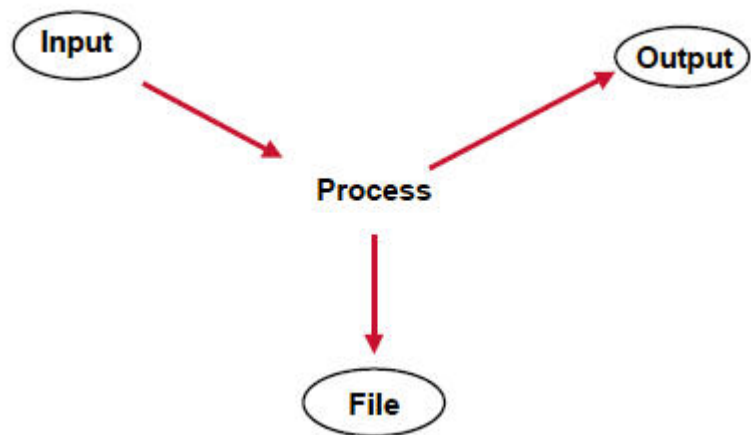
Ask a friend to draw an artefact (without showing it or telling you what it is) - such as an aeroplane, or train, and ask another friend to describe in no more than 15 seconds, what has been drawn - and you must draw what has been described - no questions allowed!

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The Process

In all cases there is:

- **an input** - this may be words, body language or even sign language;
- **an output** - an acknowledgement that the message has been received and understood;
- **a filing process**, where parts of the message are stored away into memory for subsequent recall.



It may also be that the message is immediately written down and filed away in a filing cabinet, or even that a decision is taken by the recipient that this message is not needed, and therefore it is filed immediately into the metaphorical rubbish bin and forgotten.

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Different Types of Listening

There are four main types of listening:

- **Comprehension listening** is the kind of listening that people engage in when conducting fact finding interviews or attending lectures. It involves listening to facts, ideas and themes that may be of future use.
- **Evaluative listening** is the kind of listening people engage in when trying to make judgements concerning the persuasive messages of others, such as sales persons and negotiators.
- **Empathic listening** is the kind of listening people engage in during counselling sessions, appraisal interviews and more generally when faced with someone who has a need to talk and be understood by another person. It involves the listener demonstrating a keenness to attend to and understand the thoughts, beliefs and feelings of the speaker.
- **Appreciative listening** is the kind of listening people engage in for pleasure. It might occur when listening to music, poetry or children playing. It involves the listener seeking out signals or messages that she wants to hear.

Discussion Question 6.5: In which listening types do you believe your strengths lie. Post your thoughts to the Discussion Board.

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Influencing Factors

- Selectivity
- Interpretation
- Personal bias - of both speaker and listener
- Message
- Environment

There are many competing demands for a listener's attention. An interviewer might be more interested in how the candidate is dressed, a mark on his tie, or the aura of tobacco smoke that surrounds him.

A colleague's loud voice might be a distraction, or the interviewer might only notice a hydraulic drill when it is switched off, or attention might be drawn if a person changes from a relaxed posture to bolt upright.

Background and culture might influence the meaning attributed to certain behaviours. Being aware of one's own personal filters can help a person listen more effectively. An interviewer should prepare a check list to help make sure that they are paying attention to all the relevant messages and that the effects of selectivity are minimised.

The message itself can influence how much is received. If it is bad news, or the listener does not want to know, then the tendency is often to "switch off" the listening process.

Auditory noise is only one of many environmental problems; the listener's attention might be drawn by an interesting poster, or an attractive view from a window.

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Active Listening - Objectives

Effective listening involves more than simply hearing what the speaker has said, it involves the search for a full and accurate understanding of the meaning of another's verbal and no-verbal messages.

Active listening offers an approach to understanding other people's messages in a way that deals with many of the problems identified so far.

Skills needed for active listening include:

- Help the speaker "tell his story" to the best of his ability.
- Keep the listener's attention focussed on the speaker's message.
- Help the listener give appropriate weight what the speaker says.
- Be able to organise information being received so that sense can be made of even complex or badly structured messages.
- Minimize the problems of personal bias.

The skilled listener needs to be skilled at attending to both the factual and affective content of a message, and should neither ignore or be overwhelmed by the speaker's emotional state.

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Active Listening - The Process

Listening skills can be categorised under four headings:


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Preparation

The kind of preparation that the listener can engage in involves:

- arranging important listening tasks for a time when she is least likely to be stressed or fatigued;
- increasing her receptivity by making a conscious effort to put aside temporarily preoccupying concerns, such as a recent row with her boss or the need to book a holiday flight as quickly as possible;
- arranging an environment that contains as few distractions as possible, thereby encouraging all parties to concentrate on communicating;
- reviewing background material such as notes and reports or issues to be discussed. This kind of preparation can stimulate interest and help create the right mental attitude.

Take a moment to think of anything else that the listener can do whilst preparing to listen.

Attending

Everyone, at some time or other, has been told by a friend or colleague "you are not listening to me" at which point they have leapt into their own defense by repeating verbatim what was said, but they had in fact not been listening and this had been apparent to the speaker.

Perform a specific listening exercise - where no attention is being paid; then ask the speakers what this felt like.

The listener, all of the time, should be giving out cues and messages with their body. It is possible for the listener to deliberately project an image that tells the speaker that they are "with him".

Use of the SOLER mnemonic may help the development of these attending skills.

- Face speaker **S**quarely
- Adopt **O**pen posture
- **L**ean upper part of body towards speaker
- Maintain good **E**ye contact
- Try to be **R**elaxed

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Following

The listener can encourage the speaker to talk, can better concentrate on the task of listening and can gently seek out more information to help promote a better understanding of the speaker's message by using door openers, minimal prompting, accents, statements, questions, attentive silences and a number of special concentration techniques.

- A door opener might be a description of body language:
 - "you are not looking yourself today" or "you sound a bit low"
- A minimal prompt might be:
 - "mmm", "really?" or "tell me more"
- An accent is a restatement of one or two words and might be:
 - Manager: "The report seems OK"
 - Colleague: "seemed OK? "
 - Manager "well, what I expected was "

Infrequent questions, generally we ask too many questions - it is often only necessary to ask questions when we believe that the speaker has more to say, but does not know how to say it.

"Could you say a little more about why negotiations broke down?"

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The Use of Silence

People sometimes ask too many questions because they cannot cope with even a short silence. They need to fill the gap.

Learning the *art of silent responsiveness* has been described as the key to good listening. Silence can give the speaker time to consider what to say. Watching the body language of the speaker can often be a good Indicator as to whether the the speaker is thinking, or whether the speaker believes it is the listeners turn to speak.

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Reflecting

"When we think we know is when we don't know"

Reflective listening is the skill of mirroring back to a person, in your own words and manner, what someone is saying to you.

This can be either through;

- **paraphrasing** a message,
- reflecting **feelings** if there is a high emotional content to the message, or
- try to pick out **hidden meanings** if a speaker is having difficulty with an issue.

It allows speakers to hear what they are saying, see what they are meaning and feel what is happening and through this process, come to a better understanding of themselves and their situation.

Paraphrasing what the other has said also goes a long way towards preventing misunderstandings - we often think or feel that we understand what a person has said but this is just guesswork, unless we check our understanding out with the speaker.

In summary:

- Reflect the content of the message.
- Be short and to the point.
- Reflect only the essentials of the message.
- Use your own words.



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Non Verbal Communication

Aspects of non-verbal communication, and listening through looking and watching can be used to improve our overall listening skills.

- Expression
- Eye behaviour
- Gesture
- Posture
- Voice
- Appearance
- Touch
- Time
- Space



Take a moment to think about the problems you might face during a telephone conversation. Can you see the person who is speaking? Can you read their non-verbal gestures?

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Facial Expressions

Most people pay a lot of attention to other people's faces, because they are a rich source of both emotional expressions and interaction signals.



- surprise
- fear
- anger
- disgust
- happiness
- sadness



Take a moment to think what attributes of the face indicate each of these emotional states.

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Contradictory Signals

What is the true meaning of the message if a red faced man bangs the table with a clenched fist and declares that he is not angry?

Research evidence suggests that non verbal behaviours generally offer the most reliable clues to what a person is really feeling, in spite of his denial that he is angry.

It appears that people are less likely to inhibit or manipulate certain signals. These tend to be those which they are least aware of, believe others pay little attention to or are beyond their control. In decreasing order of believability the following seven elements are proposed:

- **Autonomic signals:** such as perspiration, skin colour and respiratory patterns.
- **Leg and foot signals:** such as tightening of leg muscles and jerky, aggressive foot actions.
- **Trunk signals:** such as muscular tonus of the whole body affecting posture.
- **Unidentified gesticulations:** such as assertive finger wagging, imploring palm up hand gestures or hand chops.
- **Identified hand gestures:** such as thumbs up.
- **Facial expressions:** such as anger or surprise can be easily faked but look out for the frozen smile hidden underneath!
- **Verbalisations:** people are able to exercise most control over the verbal messages and therefore they are least reliable guide to true feelings, when contradictory signals are observed.



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Improve Your Listening

Before you attempt to change the way you listen, construct a profile of the listening skills you use. Behave as you normally behave when listening and, as soon as possible after the listening episode, review and record the skills you think you used.

Consider how your profile compares with those you have constructed for good and poor listeners.

- Which are you most like?
- Note the skills you either do not use, or use least frequently. Consider how you might use them and find opportunities to practice them.
- Commit yourself to find at least three occasions each day to put these skills into practice.
- Gradually widen your repertoire until you are regularly using a wide range of

preparation, attending, following and reflecting skills every time you listen.

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Resources

Interpersonal Skills Goal Directed Behaviour at Work, by John Hayes, ISBN 0 04 445 550 3

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Lesson 7 - Human Communications - Interviewing Skills

Human Communications - Interviewing Skills | Definitions | Interviewing Models | Bias in Interview | Purpose and Preparation | Induction | Content and Coverage | Organization of Topics | Types of Questions | Sequence of Questions | Probing | Closing | Improving Interviewing Skills

Human Communications - Interviewing Skills

Skills required for obtaining information. This is another core skill required by an Information Systems professional, and it builds on the listening skills discussed earlier.

Interviewing can take place for several reasons:

- Selection interviewing a candidate for employment, or reviewing performance of a team member.
- Interviewing a prospective system user to elicit their requirements.
- As part of a customer satisfaction survey, to determine the quality of a delivered product.
- Undertaking market research prior to development of new product.
- Assessing an organisations maturity in their use of good practice in IT management and development techniques, and hence their capability to produce certain kinds of product.

The subject matter and objectives of each of these interviews will differ significantly, but the basic skills involved in structuring the interviews and gathering the required information have many common elements.

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Definitions

Interview

A conversation with a purpose.

Bingham Moore and Bruce 1942

This is a wide ranging, umbrella like definition which encompasses many kinds of purposeful conversations ranging from disciplinary interviews to counselling sessions, and possibly even negotiations.

Interview

A face-to-face interaction in which one (or more) person(s) seeks information from another.

Hayes

A much narrower definition is adopted.

Discussion Question 7.1: Try to answer the following two questions:

- "What makes a successful interview?"
- "What could prevent the interview from being successful?"

Post your answers on the Discussion Board.

Interviewer

The effective interviewer is someone who is able to structure and manage the encounter in such a way that information irrelevant to the

purpose of the interaction is largely eliminated and relevant information is fully and accurately communicated in a relatively brief period of time.

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Interviewing Model #1

An often used, but over simplified model of the interview presents the process solely in terms of the interviewer getting information from the respondent and fails to take full account of the interactive nature of the encounter.

Obtaining full and frank answers from another person is not an easy task. The interview is a complex social encounter in which the behaviour of each party is influenced by the other.

Respondents are aware that interviewers are observing what they say and do and, on the basis of the observations, are making inferences about them. Consequently, respondents may not openly and honestly answer all the questions that they are asked.

The problem can be further complicated in the interview situation;

- The respondent's ability to manage his/her behaviour,
- "To put on a performance" might be impaired.
- If respondents are too sensitive to the fact that they are being evaluated, they may become apprehensive and hence perform poorly.


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Interviewing Model #2

In reality, each exchange between interviewer and interviewee has a cycle of actions:

Hayes suggests the following takes place:

1. Interviewer places question.
2. Interviewee interprets question.
3. Interviewee considers and rehearses action.
4. Interviewee responds.
5. Interviewer interprets response.
6. Interviewer considers and rehearses next action/question.



Each cycle builds on previous cycles as each party becomes more involved in the interaction, and each is more likely to be able to predict how the other is likely to react given certain questions or responses.

As the interview progresses therefore and both parties become more relaxed, the level of concentration required increases, to enable effective use of all the information (both verbal and non verbal) that has been received.

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Bias in Interviews

Interviews can fail for many reasons, and evidence exists that shows many inconsistencies between data obtained by interview that in a perfect world would not have existed.

Possible inconsistencies between:

- interview data and data from other sources
- interviewees interviewed twice by same interviewer
- interviewees interviewed by different interviewers

Why might these inconsistencies occur ?

- Background characteristics such as age, gender, race and status.
- Psychological factors: such as attitudes, motives and expectations.
- Behaviour of the interviewer such as using appropriate combination of questions and levels of probing, and summarising.

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Purpose and Preparation

Understanding the purpose of the interview is paramount.

Without a clear purpose, it is likely to be just a time wasting activity.

Given that a clear purpose exists, time should be set aside prior to each interview to prepare for the interaction.

The output of this preparation time is a strategy of how the required information is to be obtained and a plan of how the interview is to be conducted.

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Induction

The initial part of the interview is the most crucial.

The interviewer needs to communicate it's purpose and establish terms of reference.

It may have been appropriate to issue documents briefing the interviewee on the objectives of the interview and the topics to be discussed prior to the interview itself taking place.

This should speed up the induction process, but the interviewer still needs to satisfy themselves that any such documents have been read and understood by the interviewee.



The interviewer needs to ensure that rapport and motivation of all parties involved is established via techniques such as:

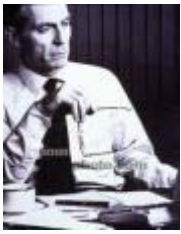
- Ensuring appropriate seating arrangements are set up.
- Ensuring telephone interruptions are avoided.
- Standing up and shaking hands or other appropriate greeting made.
- Use of attending techniques as discussed in the lesson on Listening Skills.

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Content and Coverage

When designing the interview plan during the preparation, the interviewer needs to give thought to the kind of information required.

All points in the plan should be relevant to the purpose, as independent from each other as possible, to avoid duplication of questions and potential time wasting.



They should provide sufficient information to enable assessment of the quality of responses given, and cover all the dimensions needed.

The development of a detailed plan does not represent an ordering of questions to be asked in an interview but it provides a framework or a checklist against which information can be allocated as and when it is obtained.

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Organization of Topics

When deciding the order in which topics are to be addressed in an interview, a useful guiding principle is to put yourself in the shoes of the respondent and select an ordering that is most likely to help him understand the questions and motivate him to respond.

A respondent may easily misunderstand complex questions if he has not been given cues that will key him into a *frame of reference*. Topics can be ordered in such a way that the respondent is encouraged to think about a range of issues before answering a question on a more complex topic.

Thus on the one hand the organisation of topics in an interview schedule can provide the respondent with a frame of reference that will help him to better understand a difficult or complex question, the organisation of topics can also lead the respondent to answer in a particular way. This can be dangerous when the aim of the interview is to explore how the respondent really feels about an issue.

Discussion Question 7.2: Develop an interview plan and a frame of reference to undertake an interview on a subject that is currently receiving significant local media attention. Post your plan on the Discussion Board.

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Types of Questions

The formulation of questions posed by the interviewer, can have an enormous impact on the quantity and quality of information the respondent will disclose. There are two main aspects to question formulation:

- the degree of freedom given to the respondent to answer (**open vs. closed questions**);
- the choice of words - the extent to which the question signals an expected or preferred response (**leading questions**).

The most common use of closed questions are those that require the YES or NO responses, or quantitative responses to "how many/much/old" questions these are useful where simple factual information is required.

Open, questions leave the respondent to answer a question freely in their own words, and encourage them to talk.

Compare the Closed question:

"Do you like your new job?"

With the Open equivalent:

"What do you think of your new job?"

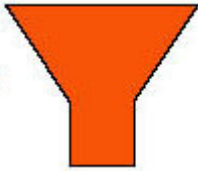
Discussion Question 7.3: Make a list of closed questions relating to the *frame of reference* just developed, and then offer an open alternative to each one. Post your questions on the Discussion Board.

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Sequence of Questions

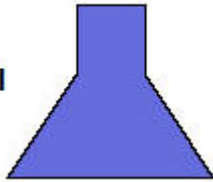
Likewise selecting an order for the different types of question is crucial. Each selection of sequence, has a place in an appropriate setting.

Funnel



The **funnel** is a sequence which begins with a very open question, and then continues with a gradual decreasing level of openness, and each successive question becomes more focused.

Inverted Funnel



The **inverted funnel** can be used to help the interviewer gather relevant information: for example, about what happened or why the respondent behaved in a particular way, before seeking to explore the reasons why.

Tunnel



In some circumstances, all the questions may exhibit the same degree of openness, for example to elicit objective or factual responses as quickly as possible. This is known as the **tunnel** sequence.

Erratic



Erratic or inconsistent sequences of questions can be dangerous if used without care, as they often designed to disorientate the respondent and to obtain information that the respondent would prefer not to reveal. Not knowing what kind of question to expect next can confuse the respondent.

Discussion Question 7.4: Which approach to sequencing the questions, best fits the frame of reference that you have been developing. Post your answer on the Discussion Board.

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Probing

No matter how much care the interviewer has exercised in wording and asking a question, there will be many occasions when the initial response will be incomplete or inadequate in some way. Probing is the technique that can be employed to encourage the respondent to provide further information.



There are three criteria for effective probes:

- They must enable the interviewer to motivate the respondent to engage in additional communication on the required topic.
- They must enhance, or at least maintain, the interpersonal relationship between the interviewer and respondent.
- They must accomplish this purpose without introducing bias or modifying the meaning of the primary question.

Bias and modification of meaning are aspects of probing that must be managed carefully. Simplifying, shortening or rewording questions can result in the intended meaning of the primary question being changed significantly.

Bias can also be introduced if the interviewer fails to provide the respondent with sufficient time to answer the primary question before asking a supplementary or probing question.

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Closing

Before closing the interview, it is necessary to ensure that the main purpose of the interview has been fulfilled. The absence of appropriate closure behaviour can leave the respondent unsure about whether he should wait patiently for another question, continue talking, or get up and leave.

One of the most useful closure behaviours is the summary. It helps the interviewer check that she has remembered and recorded the main points discussed. It reassures the respondent that the interviewer has listened attentively and provides him with the opportunity to clarify or elaborate.

Remarks such as:

- "Before we finish let me review ..."
- "Thank you for your time, that has been very helpful"
- "Can we meet again before I complete my research?"

help to persuade the respondent that his participation in the interview has been worth while and can be especially important when the interviewer wants to arrange a follow up interview.

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Improving Interviewing Skills

The first step in developing interviewing skills is to assess how effective you are at getting information in an interview setting.

There are several techniques you can employ:

- Self assessment
- Try out different strategies in "mock" settings
- Solicit feedback from interviewees



The best way to improve is to practice preferably in a non-critical setting, where constructive feedback on performance is possible.

Discussion Question 7.5: Which techniques you are using effectively, and which could be used or improved upon. Post your answer on the Discussion Board.

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Resources

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Lesson 8 - Resource Management

Resource Management - Managing Subcontractors | Value Chain | Supply Chain | The Process | Critical Success Factors | Customer Responsibility | Things to Think About | Needs | Procurement Options | Strategy for Acquisition | Eliciting Requirements | Selecting the Supplier | Progress Monitoring | Planning to Accept | What Next ? |

Human Communications - Negotiating Skills | Bidding | Negotiation Process | Negotiating Team | Preparation | Climate Setting | Choice of Strategy | Definition of Opening Bids | Bargaining | Settling | Improving Negotiating Skills |

Resource Management - Managing Subcontractors

Organisations need information systems and software products to help them manage their activities and to supply products and services to their customers. Often these systems and software products are key to their success, particularly for a small organisation. Acquiring such an information system is a significant task for the purchasing organisation if the expected benefits are to be realised. The ability of the customer to select the right system or software, establish an effective relationship with the right supplier and manage the contract will maximise the likelihood of obtaining the right solution within the desired timescale and cost.



Equally, suppliers must be able to deal effectively and appropriately with their customers in order to deliver their products and services predictably and profitably and in the first place give them confidence that this can be achieved.

Although the scale of the problem may differ, the same issues arise when a provider of IS products and services is unable to resource the requirements, and it is necessary to utilise a subcontractor.

This lesson covers the topic of subcontracting an Information System Development or Service, regardless of what your position is in the supply chain.

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Topics

From a customers point of view, we are going to discuss the procurement or acquisition strategy, how to select an appropriate supplier to meet your requirements, and once selected how do you achieve a working relationship with your supplier.

But before we look at the detail of subcontracting, we explore the value of IS to a business, and look at an example supply chain.



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Information Systems in the Value Chain

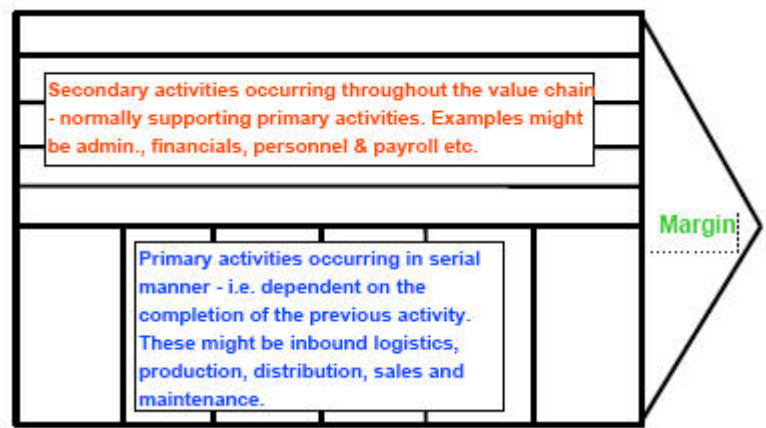
Information Systems can add value to both primary and secondary activities of any business not just those involved in the Information Systems sector.

Any one or all of these activities may be supported by IS, and may be under the direction of local management.

If local departmental management are solely responsible for sourcing their own IS systems or services, then an organisation can soon find

itself dealing with many different suppliers or even one supplier, but through many different communication channels.

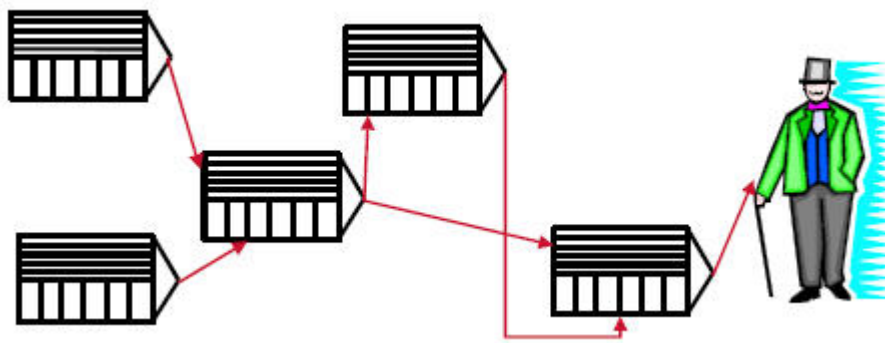
This can cause an organisation to waste both time and cost, through non compatible systems being invested in.



It is paramount therefore, that a corporate strategic approach to the investment and acquisition of IS systems and services is established.

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Supply Chain



Supply chains occur when two or more organisations or individuals are involved in the production or delivery of a product or service. There may be many such organisations for each product each adding their own value to the product and margin onto the cost that must be finally be placed on the end user(s).

In general, the longer the supply chain the greater the risks involved. The earlier your organisation is placed, the further away you are likely to be from the end user, and the closer you are to the end user, the more dependent you are on all the organisations before to supply on time and to the required quality levels etc.

If an organisation has no IS acquisition strategy in place, it is a useful approach to analyse the current supply chain(s) in which the organisation resides.

At least, understanding the chain of supply related to the particular system or service that you are intending to subcontract, can assist in the management of the risks that may affect a successful completion.

Discussion Question 8.1: Draft a supply chain related to your own role/organisation, considering the following:

- What are the risks that beset your organisation?
- How could those risks be avoided or reduced?

Post your draft supply chain on the Discussion Board.

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The Process

The process of acquisition involves several distinct steps:

- **Identify the need.**

- Identify a need to acquire, develop, or enhance a system, software product or software service. Once this need is identified, the system, product or service can be selected.
- **Prepare and negotiate contract.**
 - Negotiate a contract with the supplier that clearly expresses the expectation, responsibilities, and liabilities of both the customer and the supplier.
- **Monitor the acquisition.**
 - Monitor the acquisition against the agreed acquisition documentation so that progress can be reviewed and evaluated to ensure that specified constraints such as cost, schedule, and quality are met.

The successful implementation of the process will result in the following outcomes:



- A contract will be developed which clearly expresses the expectations, responsibilities, and liabilities of all parties involved.
- A product or service will be produced which satisfies your customer's/users stated need.
- The acquisition will be monitored so that specified constraints (such as cost, schedule and quality) are met.

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Critical Success Factors

The costs of acquiring or enhancing a software system are often underestimated as expectations and ambitions tend to increase during the production process.

Controlling these ambitions requires careful management decisions both by the Customer and Supplier to ensure no detrimental effect on the success of the project.

A clear understanding by the customer of the needs to be met by the system, and its significance and value to the business is essential.

Clear identification of project success factors and appropriate management planning and control of the project by both parties are therefore crucial to this whole process.

Examples of critical success factors and management responsibilities for customers are listed below. Customer success factors are mainly related to the impact that the new product or service will have on the ability of the organisation to carry on its business more effectively. These include:

- Improved efficiency of the organisation.
- Decrease in costs.
- Improvement of service levels.
- Support for future business policies and directions.
- Achieving or retaining compliance with industry standards.
- The degree to which the users welcome the system.

Before showing the next visual, the lecturer may wish to brainstorm the customers responsibilities throughout the acquisition process with the students.

Discussion Question 8.2: Before continuing, what do you think are the customer's responsibilities throughout the acquisition process. Post your thoughts on the Discussion Board.

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Customer Responsibilities

Customers **can never relax**, the customer needs to retain an involvement throughout the acquisition process.

In terms of good management control, the Customer responsibilities are to:

- decide on and secure the project budget;

- define its project and quality plans;
- to control the requirements, particularly if they change;
- define the customer's and supplier's expected involvement in the project;
- sign off documents appropriately, and not waste time unnecessarily;
- attend review and progress meetings;
- supply requested information and decisions in a timely fashion so as not to hold up the supplier;
- conduct or witness acceptance tests;
- organise user training;
- provide an interface between the users and the supplier or support organisation for post implementation support;
- comply with procedures for reporting defects to the supplier and differentiate between the faults and enhancements;
- manage the integration with other systems as appropriate.



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Things to Think About

Before the contract to undertake a task is let and signed,

it is important to ensure that all of the following are taken account of:



- Are the needs of the users clearly understood?
- Is there a real requirement or is it a just a set of wish lists?
- Are the roles of the customer and supplier (potential or actual) defined and understood?
- What form of contract is appropriate: fixed price; cost plus incentives; time hire; or time and materials?
- Who will produce the detailed specification and how?
- Have the project success criteria been established?
- How are the non functional system requirements to be established and expressed?
- Will special factors such as safety criticality affect the development and test process and therefore costs and timescales?
- Will a customised package or a bespoke system be the most appropriate solution?
- Have legal, regulatory and ethical issues of the project been considered?
- Have the risks to the project been identified?

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Identify the Need



Careful consideration of business objectives and user needs is vital and must represent a realistic assessment of what can be achieved.

They must be endorsed by senior management and agreed with the appropriate level of users and all interested parties.

These needs are often documented and analyzed as part of a **feasibility study**, which collates the primary needs of the users or the business and examines different approaches to a solution.

Once some level of feasibility has been determined, a set of high level requirements can be established and documented. These often include information on:

- background to the requirement;
- outline requirement;
- external environment ,
- assumptions and expected changes;
- references;
- acceptance or success criteria.

Identifying the need is required, regardless of the source of the labour.

Discussion Question 8.3: Why would it be even more critical when a system or service is being "out sourced."

Information Systems Procurement Options

Product	Often shrink-wrapped
Customised product	Customised by customer or user
Tailored product	Often tailored by supplier or developer
Bespoke development	Could be part of 'black-box' purchase (often invisible)

Just concentrating on the product side of acquisition there are four main options when deciding to procure:

- **Shrink wrapped Commercial Off The Shelf (COTS) Product**
 - that may be possible to configure to your requirements, but such configurations are limited to the flexibility of the product amendments and the fixing of problems can be tortuous even if they are possible. Examples include word processors, spreadsheets, personal organizers etc
- **Customized Product**
 - where additional flexibility of use has been designed into the product to enable it to be customized by many users to meet their specific requirements. The level of support from the supplier in these cases is likely to be higher than for COTS. Examples include financial accounts packages
- **Tailored Product**
 - where the basis of a product already exists possibly having been developed for another customer, or and it needs to be specifically tailored to your requirements by the supplier / developer. Examples may include Point of Sale systems, warehousing and distribution systems.
- **Bespoke Development**
 - where the entire product needs to be developed specifically to meet your requirements.

Discussion Question 8.4: Can you think of other examples that would fit each of the above categories? and What are the pros and cons of selecting each of the above options. Post your answers on the Discussion Board.

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Strategy for Acquisition



Once the customer has determined the need and the high level requirements, an acquisition strategy can then be considered.

This is a form of risk management, and the approach is dependent on the specific situation and problems posed by type of project proposed.

The approach may include:

- providing training to all the participants in this stage of the project, so that they are aware of the implications of their decisions and actions on the success of the project;
- using legal or financial mechanisms by including appropriate clauses in the contract or taking out insurance policies;
- assessing the appropriateness of different contracting scenarios such as:
 - a single contract with a single supplier;
 - a series of contracts with one or more suppliers e.g., dividing the overall work into contracts for the Specification; Development and Maintenance of the system;
 - undertaking the project as a Joint venture with one or more suppliers;
 - arranging for phased delivery of system components.

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Eliciting the Requirements

The Requirements Elicitation activity begins soon after the need for a system or service is identified, peaks during the early development phases of Requirements Specification, but it continues throughout the development and use of the system or service, to ensure that the system or service continues to meet the changing needs of the business and its users.

The responsibilities for undertaking this activity change throughout the life cycle depending upon the type of system under consideration and type of customer/supplier relationship established.

This process is mainly the responsibility of the customer, but the customer may not have the staff capable of performing the required tasks.



It is possible that an independent consultant be contracted during the early needs analysis phase and this consultant retains responsibility for managing the requirements throughout the life of the project and system. It is more likely, however, that the customer will begin the process, and then hand over to the supplier on award of contract, though it should be noted that the customer is ultimately responsible for deciding which requirements are implemented according to business priorities and constraints.

Whoever is performing this role, however, it is essential that control be kept of all proposed requirements whether they are included in the first release of the Requirements Specification, or whether they occur during development or maintenance.

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Requirement for Shrink-Wrapped Product

If there is no end user identified, at this stage, i.e., the product is intended for a mass market, it is important to establish alternative sources of user input such as via the Marketing Department of your organisation.

It is important to:

- identify who are the people that need to be interviewed, and which documents form the basis of the customers needs;
- ask the right questions;
- analyse the answers.



It may be necessary to undertake some market research to evaluate the proposed properties of the product.

Discussion Question 8.5: How could a market research activity be undertaken. Post your thoughts on the Discussion Board.

[GOTO TOP](#)

Selecting the Supplier - Where do you start ?

Selecting the most cost effective and capable supplier will contribute significantly to a successful project.

The customer needs to ensure that suppliers know and understand what is required and can respond in a way that can be effectively evaluated. (Note: The cheapest supplier is not necessarily the most cost effective or capable.)

For many organisations, experience gained over a number of years will enable them to make an initial selection of a number of potential suppliers who are likely to satisfy their needs on a particular type of project or for particular applications. If you do not have this level of experience it may be possible to obtain advice and information from:

- informal consultation with other similar companies or relevant trade associations;
- studying advertisements in journals related to the organisation's business (this can provide a good indication of companies that believe they can meet the service needs of the business area);
- using a consultant with experience in your business domain and the type of supplier that you expect to use.



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Selecting the Supplier - Short Listing

A short list of suppliers to whom to send the Request for Proposal can be drawn up by examining the following characteristics:



- Financial position of the company and number of years in business also by studying the last annual report.
- Obtaining details of past and current projects, directly related to the required system; this may be extended to include a requirement to demonstrate experience in any novel or risky areas of the requirement and taking up of references from previous successful applications in similar industries.
- The number and turnover of staff along with their skills, qualifications and experience.
- The supplier's commitment to process improvement and membership of any software quality or process improvement bodies or associations.

Discussion Question 8.6: Can you expand on this list and some of the issues that arise when creating such a shortlist ? Post your thoughts on the Discussion Board.

How do you assess an organisations commitment to quality and process improvement?
Make reference to ISO 9000, and Total Quality Management principles
- do not rely 100% on certificates displayed on the organisations walls!

[GOTO TOP](#)

Selecting the Supplier - Evaluating Responses

The Request for Proposal or the Invitation to Tender should be structured with Proposal Evaluation in mind.

A considerable amount of time and effort needs to be devoted to devising a list of questions to ask potential suppliers. If the information is elicited in a consistent and usable form, meaningful evaluation is possible in a realistic timescale. It is also important to ensure that sufficient time is allowed to the suppliers for preparation of proposals.

Evaluation of the responses is easier if the following separation is distinct between:

- the system requirements;
- the requirements for the management and control of the project;
- the conditions of contract such as delivery schedules and IPR (Intellectual Property Rights), and warranty requirements.

Ensure that you treat all potential suppliers equally for example, if the deadline for responses is extended, all should be informed.

It may help to use weighted ranking to score the responses from the suppliers, in order to create a preferred ordering of supplier. This is performed by allocating a priority to each of the requirements, and scoring each suppliers' response against their compliance with each requirement. Simple arithmetic will then enable an ordering of preferences between the suppliers.

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Progress Monitoring - Achieving a Working Relationship

The customer needs confidence that the supplier is able to deliver the required product and/or service and therefore fulfill the contract. Where problems or risks are identified, the customer needs to be able to work with

the supplier to decide on corrective actions or improvements.

The key requirement is that the expected products are delivered successfully in accordance with the contract system or service requirements.

It is essential that the customer retains close visibility of the supplier's processes.



The Customer Project Manager needs to be able to identify activities which are likely to put the project at risk either of not meeting timescales, exceeding budget or not achieving required quality. Mechanisms for obtaining and retaining the required level of visibility need to be established prior to the signing of the contract. These are likely to be by the use of regular Progress Reports, attending Joint Reviews, or by undertaking project evaluations or audits.

Where the development is further sub contracted by the supplier, the customer organisation may require the supplier and sub contractor to sign an agreement giving the customer direct access to information on the sub-contractor's performance during each life cycle phase.

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Progress Monitoring - Nearly There !

Both customer and supplier need to agree whether the contract has been satisfied and to determine how effective the deliverables will be.

The system or software acceptance phase of a software development project is normally the last phase of the life cycle before operation, marking the end of the development of the software and the beginning of the actual use of the system as envisioned at project initiation.

This is the time during which the customer and users need to find out whether or not the system is in fact the one they expect.

However, the product acceptance activities are not restricted to the product acceptance phase.



They begin early in the development life cycle and continue throughout the operational life of the system. These include monitoring the suppliers use of appropriate techniques and testing strategies during the development and maintenance of the system.

Also, where the requirement constitutes the delivery of a service, continual assessment throughout is typically by means of targets within a Service Level Agreement. One of the characteristics of a service is that acceptable performance achieved to date does not guarantee the same in future and therefore continual evaluation of performance is needed.

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Planning to Accept

Acceptance needs to be well planned in advance, along with an agreement as to what constitutes [acceptance](#).

An Acceptance Test Plan or Specification, which becomes the driving force behind this process needs to include items such as the following:

- Objectives of the tests to be carried out.
- Cross reference to appropriate requirements.
- Resources required, including personnel, testing tools, interfaces to other systems etc.

- Details of any testing standards to be used.
- How test inputs are to be generated: for example, written by hand, converted from live or historical data, random test data generators etc.
- For each individual scripted test, an exact description of the input required, the expected output, the order in which the test items are to be input and where and how the test scripts will be stored and updated.
- Pre conditions or entry conditions for running each test.
- Procedures to be followed if the test cannot be run as specified.
- Tracking procedures to keep track of all executions of the test.

It should be remembered, however, that *the acceptance testing process should be in the form of a demonstration not a destructive test you should not be trying to break the system at this point!*

Some unscripted testing should also be allowed for.

This ideally should be undertaken by real users of the system, since they will bring to it the true user's viewpoint.

They should be given free rein to do whatever they want to do, but should have had adequate notice and training so that they will do something sensible.

They should also appreciate that the system should correspond to the Requirements Specification and not necessarily work the way they think it should work.

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Results of Acceptance

Problems identified during the Acceptance Test need to be recorded and analysed, with a decision regarding the Acceptance being taken with due care. There are three main possible scenarios:

- Yes, the system has passed without qualification (rather rare).
- Yes, the system has passed but with provisos as detailed, provided that they are cleared within a given time.
- No the system has not passed: the reasons for the failure are listed and detailed.

In many cases, reaching agreement is not clear cut. The importance or criticality of the problems can often be difficult to establish objectively, as many individuals tend to become emotionally involved during this phase. It is important however, that the decision is reached by weighing the various factors in the particular circumstances as objectively as possible. This is why it is important to establish and agree the *success* or *acceptance* criteria during the early stages of the project.

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What Next ?

Before the system goes live, it is necessary to review the risk assessment process undertaken prior to the development to ensure that no new risks to the operational performance of the system have been identified.

If any have been identified, then steps need to be put into place to remove these risks or reduce the effect of them.

As each release of software or system is issued to a customer or group of users, it is necessary to assess their acceptance or satisfaction with the new functionality against criteria that were agreed during the Requirements Specification processes.

The supplier should be able to assume that the system and software will be operated in its intended environment and in the specified way, and that when problems occur, they will be notified promptly with accurate information. Any problems identified, should be dealt with using an agreed problem resolution process.

Dependent on the terms of the contract, the customer should be able to assume that the



supplier will monitor, record, and respond to all user requests and problems relating to the software.

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To summarise, when dealing with suppliers and subcontractors, it can be very easy to resort to battleground tactics.

This must be recognised early on during the acquisition, and everything possible undertaken to achieve and maintain a working relationship.

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Human Communications - Negotiating Skills

We are all negotiators.

Negotiation is a process of joint decision making, where the parties have differing preferred outcomes.



Give and take are natural every day elements of life, and much of this represents negotiation of some form. It may be to determine a purchase/sale price of a product; or to negotiate a greater amount of budget to undertake a required task. The object of negotiation is not restricted to financial units time may also be negotiated.

Some people are better negotiators than others, and consequently, are more successful in terms of achieving their desired outcomes.

Discussion Question 8.7: Are there any local negotiation techniques that you have been exposed to, that you might want to share with your colleagues. Post your thoughts on the Discussion Board.

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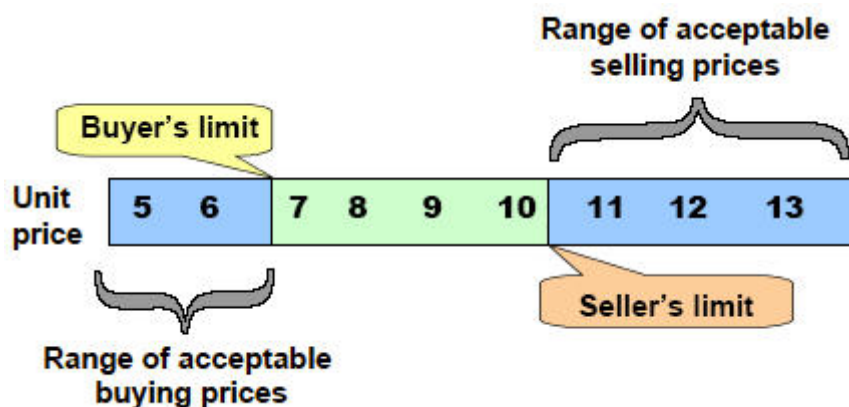
Bidding

When people begin to negotiate they normally have some idea about the level of benefit that they hope to secure.

This is their **target outcome**.

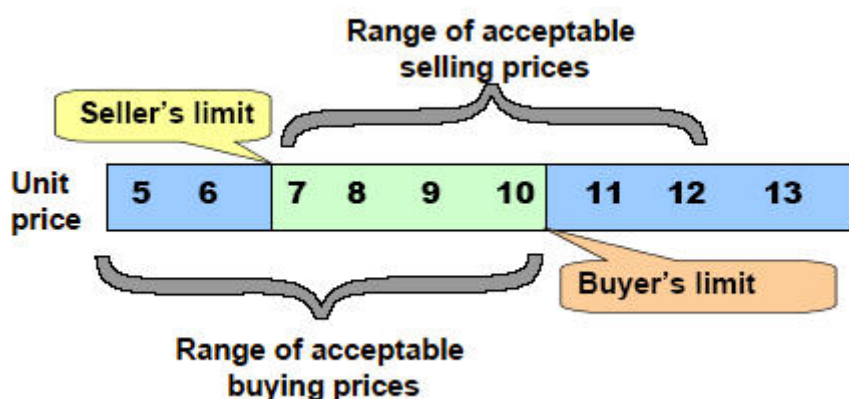
They also have some idea about the level of benefit below which they will not go.

This is their **limit**.



Negotiation is not necessarily a win-lose situation, but if both parties enter into negotiation when their criteria are as shown above, then unless both negotiators have the strength to stick to their limits, someone is bound to lose.

Discussion Question 8.8: How might one establish that this is the scenario, and are there any circumstances which warrant negotiation? Post your thoughts on the Discussion Board.



This is a more reasonable starting point, where a settlement is almost certainly possible, and the final price will be determined by the skill of the negotiators:

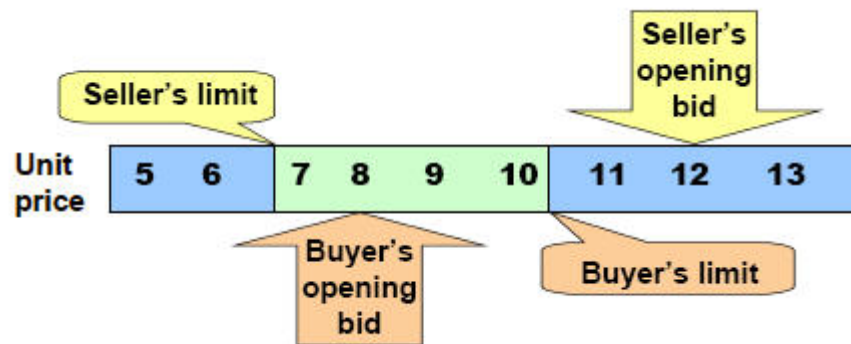


If the seller has the greater skill, then the price will be nearer 10 and
if the buyer has the greater skill, then the price will be nearer 7.

Skilled negotiators attempt to discover their opponents limit. To push an opponent beyond his limit will lead to a breakdown in the negotiation.

The competitive negotiator seeks to secure an agreement as close to their opponents limit as possible, thus maximising their own benefit.

To achieve this outcome, skilled negotiators need to know how to research their opponents case before coming to the negotiating table and, during the negotiation must be skilled at probing and listening, so that all available information is gathered and can be used to maximum advantage.



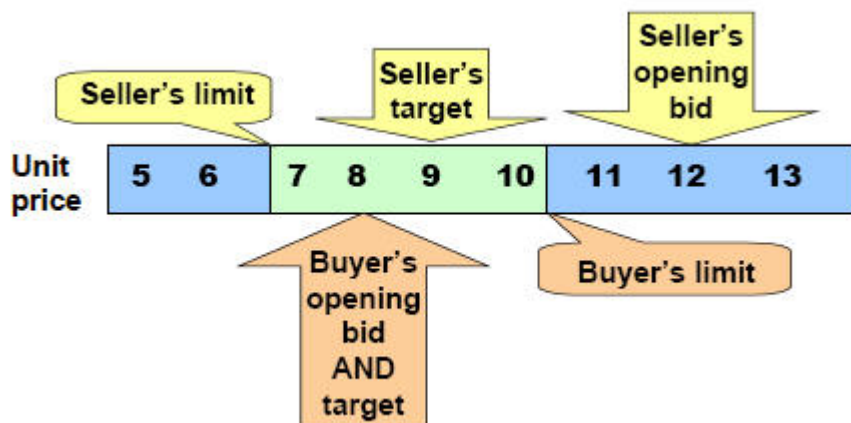
Opening bids are important.

Unskilled negotiators can weaken their position considerably by making inappropriate opening bids.

If an opening bid is made by a buyer above the seller's limit, then it will be almost impossible for them to reduce their bid in a subsequent negotiation (even if they discover the same product is being bought by another organisation at a lower price).

The normal convention in negotiations is **that the opening bid does not represent the final position and that some concessions will be made**. However, each party attempts to convince the other that their opening bid is in fact very close to their limit and they have very little room to make concessions.

Skilled negotiators are able to employ tactics that help them to convince their opponents that they must concede if an agreement is to be reached, and are able to counter similar tactics when these are employed against them.



Given negotiation conventions, and knowing that some concessions will probably have to be made, most skilled negotiators will make opening bids beyond their target.

If the buyer's opening bid as shown here also represents their target, there is a strong likelihood that the final settlement will yield less than their target benefit.

Discussion Question 8.9: Derive a process for negotiation identifying the various stages that you will go through, and how you can achieve a satisfactory settlement. Post your answers on the Discussion Board.

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Negotiation Process

There is, however, more to negotiating than bidding and counter bidding.

Negotiating Team

A negotiating team is useful for larger, more complex

acquisition projects.

Such a team should not be allowed to get too large.

It should be given a clear mandate and should be the sole channel of communication between the two organisations during the process.



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Preparation

Preparation is about anticipation. Establishing what it is that you want, then attempting to guess parameters within which your opponent will be working.

Your case will be significantly weakened if you do not have the time to prepare properly.

It is important, at the outset of a negotiation, to have a clear idea about what is wanted and, therefore, what needs to be negotiated. Rarely are negotiations concerned with only one variable such as price. Someone buying a car also needs to agree on the model, colour, delivery conditions (charges and timescales), payment terms etc. It is not unusual for an individual to feel that they have negotiated a better deal on price than from another motor dealer, only to have the car delivered with no radio, interior mats, mud flaps etc., all of which they thought were part of the standard product.



Preparation not only involves thinking through what it is that the negotiator wants to achieve, but also **how** it is going to be achieved. This also involves undertaking some research what the opponent wants, what concessions they would value, and how they are likely to go about getting it.

Predictions about how the opposition is likely to behave can help the negotiator plan an effective strategy.

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Climate Setting

People's behaviour can be interpreted in many different ways.

Dealing with someone known to be trusted is very different from dealing with a stranger you are meeting for the first time.

How is it likely to differ if they have never met before?

When negotiating, especially with strangers, it is easy to get drawn into a competitive interaction where one party seeks to maximise his or her benefit at the expense of the other.

Careful management of the initial encounter might increase the possibility of discovering a common purpose and establishing the trust that is necessary for collaborative negotiation.



Concentrating on the process, can offer a relevant but neutral topic that provides a useful context for testing and manipulating the climate. This includes:

- **introductions** of the people involved;
- **purpose** of the negotiation;
- **agenda** for the meeting topics, order, etc;

- **time** available for the current meeting and any other restrictions on time.

Choice of Strategy

Competitive	Collaborative
-------------	---------------

Discussion Question 8.10: What is the difference between these approaches, and under what circumstances should each be employed. Post your answers on the Discussion Board.

Negotiators with a high need to win are likely to err towards *competitive strategies*, especially if they feel that they are in a strong bargaining position.

Competitive strategies are also likely to be adopted where one or both parties do not trust the other's intentions, where they feel that their opponent will exploit them and where they expect the other only to make concessions when forced.

These will usually result in win-lose scenarios.

Skilled negotiators are more likely to favour a *collaborative strategy*, especially where two key criteria are satisfied. These criteria are:

- trust; and
- that a mutually beneficial outcome is believed to be possible.

In order to enter into *collaborative negotiations*, **there must be an element of trust between the parties**, as it is often necessary to disclose information about goals, priorities and limits to the opponent.

The mutually beneficial outcome may be the case when all parties believe that a problem solving approach might lead to a more beneficial outcome, or if each party controls resources that would cost little to give up but would have a high value for the other.



Definition of Opening Bids

Whatever strategy is adopted, some consideration needs to be given to the opening bid, however in collaborative negotiations, it is more likely that the climate setting phase will assume greater importance.

Opening bids are influenced by several factors:

- The desire to protect the limit from detection.
- To provide room to trade concessions.
- To challenge the opponents expectation of the likely outcome.

This graph shows the relationship between the opening bid and the likely outcome:

If a seller's opening bid is too low, then the instinctive assessment by the buyer is likely to be:

"This is too good to be true, what is wrong with it?"

and suspicions about the object under negotiation will be raised. Especially where individuals are engaged competitive negotiation, they are more likely to value an outcome if they

have to work hard for it.



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Bargaining - Competitive Tactics

These are several tactics that should be considered if entering into competitive strategy negotiations.

- Demonstrating a commitment to hold firm, can be achieved by indicating that there is no room for maneuver, or there is a limited mandate to negotiate. Small concessions, offered slowly, are more likely to reinforce this.
- Imposing time pressure, by persuading the other party to concede by increasing the perceived cost or risk of continued negotiation.
- Reducing the other's resistance to making concessions by attempting to shift the other's limit in a favourable direction, lowering the others expectation of benefit to be achieved, and convincing the other party that they have underestimated the value of concessions already offered.
- Improving the relationship and the mood, as people tend to help people they like, identify with or depend on.
- Creating opportunities to take time out and think, as sometimes an unexpected opportunity presents itself or an opponent makes a move that puts the negotiator under pressure.
- Resistance and retaliation indicating that the negotiation has broken down and the parties are heading for a lose lose situation.



Discussion Question 8.11: Choose two of these tactics and discuss the pros and cons of each, and under which circumstances they may best be utilised. Post your answers on the Discussion Board.

Bargaining - Collaborative Tactics

Collaborative negotiation involves the search for a mutually beneficial agreement and as such depends on openness and a greater willingness to offer concessions. The risks therefore are different, and need to be managed appropriately, depending on the level of trust there is between the negotiator and the opponent.



The highest risk tactic is to offer a large concession, in the hope that this will be reciprocated. If it is not reciprocated the negotiator will have substantially weakened their position.

Signals and hints to suggest the possibility of concessions may be more appropriate, so the negotiator is less likely to lose image if the opponent does not reciprocate. Use of non-verbal communication techniques such as gestures may be used.

Use of intermediaries, may be useful if there is believed to be a greater personality match between the intermediary and opponent than between the negotiator and the opponent.

Informal problem solving sessions make use of opportune meetings such as lunch or in the lift. Because they occur outside the formal framework of the negotiation, they provide a greater opportunity to explore possible

moves, and the opponents reaction to them.

Small concessions, followed by larger ones if reciprocated.

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Settling

This final process involves recognising when the other party is ready to settle and making or accepting a proposal that will form the basis of an agreement.

In few cases a verbal summary will suffice, but more often it is necessary to ensure all the terms and conditions agreed during the negotiation process are written down sometimes in legal detail. This emphasizes the importance of ensuring accurate notes of all the negotiation discussions are made.



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Improving Negotiation Skills

It is likely to be beneficial to your own skills in negotiating, if you are able to observe other parties negotiating. Try and keep a log of the discussion points, and find the threads through the process to the settlement.

Try and identify a typical approach that that would favour certain tactics and ignore others are you inclined towards being competitive or collaborative?

Ensure that you are clear about the limits for each circumstance, and what the target outcomes are not only in financial terms.



Do not forget that some people have a strong need to win and enjoy the cut0and-thrust of competitive bargaining and have few scruples regarding concealment and bluff. Similarly others may have a strong need to be liked and a well developed sense of fairness.

Develop an aide memoir of key information that you can use in any situation.

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Resources

Interpersonal Skills Goal Directed Behaviour at Work, by John Hayes, ISBN 0 04 445 550 3

Links

[Project Management Glossary](#)

Lesson 9 - Resource Management - Acquisition and Contract Management

Resource Management - Acquisition and Contract Management | Typical Problems and Causes | Risk Management | Contract Legal Issues | Managing Supplier Relationships - Working Together | Poor Supplier Relationships | Relationship Maturity | Information System Hierarchy | Boston Matrix | Classification of IS | Prisoners' Dilemma | Communication with Suppliers | Service Level Agreement (SLA) | Interviewing Process | Next Steps |

Resource Management - Managing Internal Resources | Justification and Job Analysis | Candidate Requirements | Working Environment | Appraisals |

Resource Management - Acquisition and Contract Management



This lesson looks at some of the issues surrounding managing contracts with external suppliers of Information System Solutions.

We look at the problems, and causes of those problems, briefly touch on taking a risk management approach and managing supplier relationships on an on-going basis.

Generic legal aspects are touched on in this lesson.

Discussion Question 9.1: Think about what problems are associated with dealing with sub-contractors in an IS environment. Post your thoughts on the Discussion Board.

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Typical Problems

"It's not fit for purpose"
"We've spent our budget"
"Unrealistic lead times"
"You moved goalposts"
"It doesn't fit together"
"It's delivered late"

These are not the only problems,
but they tend to recur with great regularity.

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Typical Causes

- Poor Specification
- Lack of Quality Assurance
- Weak Test Plan
- Inadequate Acceptance Criteria
- Poor Project Management
- No Phased Deliverables

The underlying causes to the problems discussed are common world wide and are the exactly the same problems which can cause an internal development project to fail.

They can lead to much more severe problems become much more severe where a system is purchased from an external organisation. There are usually fewer corrective actions available to us under these conditions.

- Legal Ramifications
- Poor / No Change Control
- Poor Design
- Lack of Standards
- Procedures Not Followed
- "But I thought "they" were doing that !"
- Insufficient "Front-end" Work

These causes again reflect some of the typical reasons for failure in IS development projects.

Legal ramifications may arise with internal projects, but are extremely common with purchased software. It is absolutely essential to have an appropriate legal framework within which to purchase software.

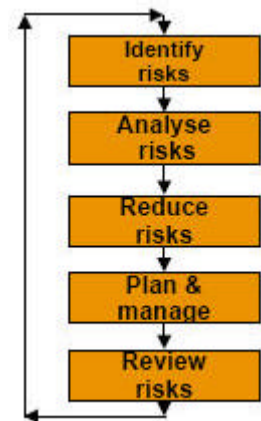
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Risk Management

Identification of risks tells us nothing about how probable those risks are. We must make some judgements of those probabilities. By combining the probability by the impact or consequence of the risk occurring, we can gain an overall assessment of its seriousness.

You may have identified and analyzed many risks. Those risks that have scored highly should result in some immediate actions and an action plan which will help you to minimize the risk in the future.

Risks change, both in type and probability. It is important that we continue to monitor risks throughout the life cycle of the project, and the relationship with the supplier, repeating the cycle of actions as needed.



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High Risk Areas

Experience shows that there are certain key areas which generate most of the risk in software acquisition. These may vary from culture to culture and between different industry sectors.

Discussion Question 9.2: What do you perceive as the high risk areas within your organization and industry sector. Post your thoughts on the Discussion Board.

Problems of interpretation and usability are usually caused by inadequate requirements specification.



Poor estimation on the part of the supplier is either a product of their lack of experience in the application area, or more frequently, a by product of the tendering approach. It is unfortunate that the software industry often relies on competitive fixed price tendering. This results in suppliers either purposely or unconsciously underestimating work in order to win the contract. Some less scrupulous suppliers may take the view that once they have won the contract with a low price, they can recoup their margins by exploiting customer lock in when it is necessary to change the requirements as it nearly always is !

Another rich source of risk are the assumptions that both supplier and customer make about the requirements, the contractual arrangements and the relationship.

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Risk Reduction

Approaches to reducing the impact of the identified risks, are again dependent upon the type of purchase being made and the maturity of the relationship between the customer and supplier.

This visual lists some of the ways that the common major risks can be avoided or reduced.

- **Phased deliverables** - to ensure that progress and quality is continually being monitored.
- **Incremental commitments** - to ensure that the users are kept involved.
- **Staged payments** - to maintain cash flow of the supplier so your project is not given a lower priority than it needs.

- **Contingency plans** - be prepared for the worst! If the worst case scenario occurred what would you do about it?
- **Supplier approval process** - ensuring that you only deal with suppliers that you can trust, and will provide appropriate visibility of progress and product.

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Contract Legal Issues

Some contractual issues that require to be established for any contract that relates to Information Systems solutions and services especially where the procurement of software is involved must include

- Copyright
- Patents
- Non-disclosure or confidentiality



There are other conventions, and in some countries none at all.

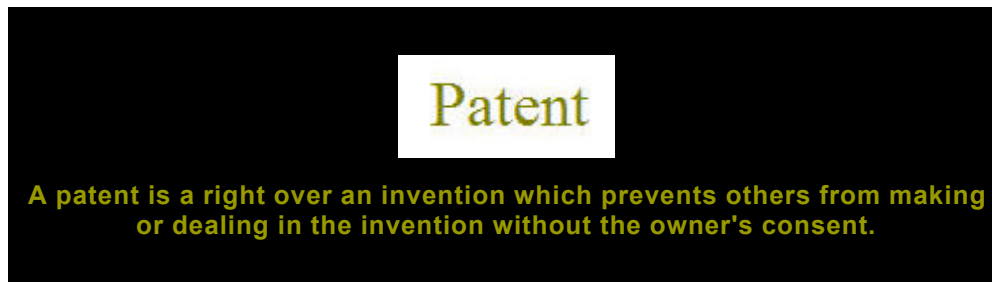
Discussion Question 9.3(a): What is the copyright law in YOUR country. Post your answer on the Discussion Board.

Under the Berne convention, the creator is the default owner of copyright, but under usual employment conditions it is the employer of the creator that owns the copyright - but this can vary depending upon the place and time of creation.

Payment for work does not automatically transfer copyright an agreement is necessary.

The problem is further compounded by the fact that the execution of software involves copying program code from disk etc. to RAM, if backup copies are usually necessary - so some copying must be catered for.

Infringement can also arise from partial copying.



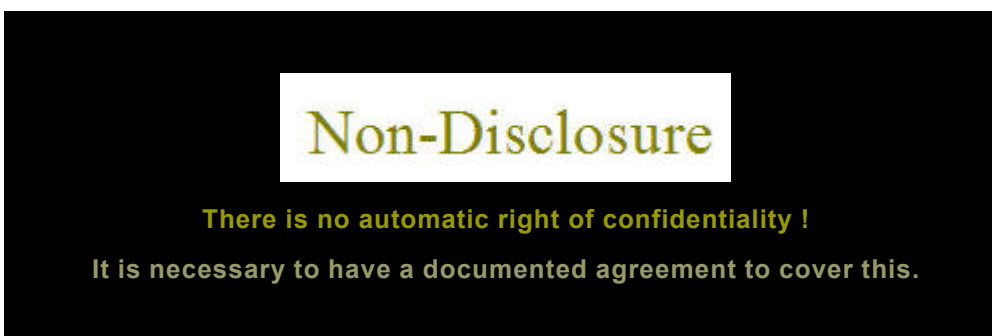
In the UK software cannot be patented:

- but devices incorporating software might be;
- device can be interpreted very widely.

In the US software can be patented:

- this is very controversial;
- US patents can affect developments internationally.

Discussion Question 9.3(b): What is the patent law in YOUR country. Post your answer on the Discussion Board.



It is necessary to define:

- Who is involved identify the parties concerned.
- Explicitly identify the confidential information.
- Why is it confidential.
- Any exceptions to this.
- What are the time limits.
- Is the non disclosure agreement subject to non disclosure?



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Managing Supplier Relationships - Working Together

As we have seen, maintaining a good relationship with a supplier of Information System services and software can be fraught with problems, much more so than for a normal customer/supplier relationship.

Think about these points:

- If a larger and stronger customer deals with many small Information System suppliers what is likely to happen ?
- Why not simply impose such stringent conditions on suppliers that all the risk is carried by them ?
- This could be taken further; why not insist on penalty clauses such that the customer could not lose financially from any possible outcome. Do you think this is possible ?
- Do you think it would solve the problems ?
- What happens when a big Information System supplier tries to do this to a smaller customer ?



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Consequences of Taking Advantage



Many customers have taken the approach of total risk transfer. Even if benefits are seen in the short term, the effect is usually counter-productive in the medium to long term.

One likely outcome is the strict interpretation of agreements by the supplier. This means that every minor variation from the agreed specification (and there are usually many) will be the subject of a new negotiation. The supplier will quite naturally seek to minimize his possible loss from the project. The time required to maintain and update this aspect of the relationship can quickly overwhelm project management.

The supplier has little stake in a one-sided relationship. Their motivation is simply to provide what is strictly required at the minimum cost. The supplier will have no interest in repeating the relationship if other opportunities present themselves.

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Results of Poor Supplier Relationships

The problems which often occur as a result of a poor supplier relationship are

manifested in a number of different ways.

These problems are the same as those which can result from poor specifications, or inadequate management of the acquisition from the customer end.

There is often a temptation to blame the supplier for all such difficulties.

Disputes cost money. They inevitably cause delays in projects.

They can eventually result in reluctance on behalf of the industry to do business with a customer.



"Any IT project is flawed if it is not initiated due to business requirements"

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The Legal Solution

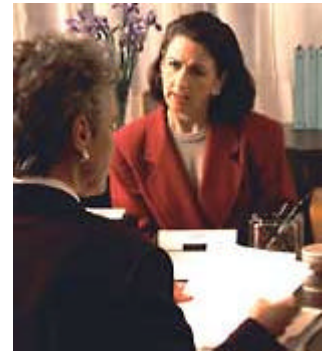
It is necessary to have a good legal basis to the purchase of Information System solutions. Agreements help to define unambiguously the relationship between supplier and customer.

The problem is that reliance solely on law to avoid problems usually fails. There is little point in having an agreement unless you are prepared to use it. Unfortunately if you have to enforce an agreement to the extent of taking action against a supplier, the costs of so doing quickly escalate. You may need additional legal input, expert reports and other expensive professional input.

It may take many years before a dispute is resolved in court. Normally the supplier will cease work as soon as the dispute becomes serious.

- What is likely to happen to your project in the meantime?

It will effectively come to a halt.



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Managing Supplier Relationships

How should we manage the relationship in order to have the greatest chance of success?

It is important that we define effective channels of communication between suppliers and customers. This should be between the key players in both companies.

We should recognize that we have invested a very significant level of resources by the time we reach the point at which we place an order with a supplier. The investment is greatest when we deal with a new supplier, and the risks are correspondingly high. We would like to gain the best return from that investment by being able to repeat the process for subsequent orders. This should also minimize risks, since we should know a great deal about the previous performance of the supplier.

One way of appreciating the value of this approach is to consider the situation if the roles were reversed. If the nominated customer was a small supplier, how would they wish to be treated so that there was enthusiasm to repeat the process with another project.



*"Think
Plan
Communicate
Achieve"*

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Relationship Maturity

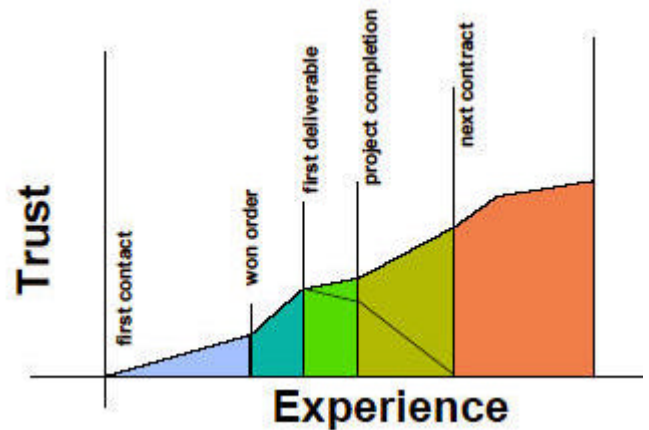
One way of thinking about this investment in a relationship is to consider how it can mature over time.

There can only be a limited degree of trust between a supplier and customer at first contact. This should grow through the process of negotiation to the point where the order is placed. (If you were not confident why place the order?)

As the first deliverables are received, the level of trust and confidence should hopefully rise significantly. (The converse is also possible.)

By the time the project is completed, both organizations have invested significant time and resources in the relationship, and that relationship has been tested. The level of knowledge of the supplier is now high, and assuming the experience has been good should result in repeat business.

The cost of placing that repeat business should be significantly lower, since we now have real knowledge of the supplier. Similarly, the supplier may be able to make a more competitive bid, since they understand the risks of doing business with you, the customer, and they understand at least some part of your operation at a detailed level.



The question we should ask is what level of investment we are prepared to make to gain these advantages. It may not be appropriate for every system or every supplier. What is needed is some way of ranking opportunities for investment in a supplier relationship.

[GOTO TOF](#)

Defining the Relationship

We should consider these questions before we spend significant resources in a supplier/customer relationship.

What kind of relationship is appropriate ?

What investment are we prepared to put into the relationship ?

What expectations do we have for the future ?

[GOTO TOF](#)

Information System Hierarchy

One approach we can use to decide which relationships should receive significant investment is to consider the nature of the application.

This visual shows systems as belonging to a hierarchy, depending on the level at which they are used in an organisation.

The higher up the hierarchy the application resides, the greater the amount of investment is worth making.

- **Senior management:**
 - Set objectives, decide resource level and determine policy
- **Middle management:**

- Assure the resources are effectively and efficiently employed
- **Operational control:**
 - Ensures that the detail of the work to be performed is efficiently monitored

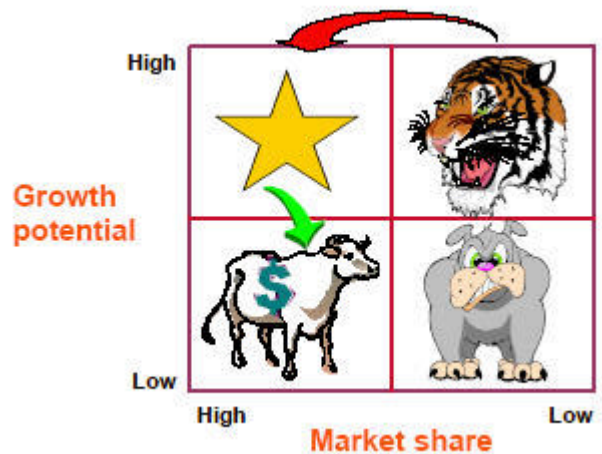


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Boston Matrix

We can also classify systems themselves according to their investment potential using the Boston Matrix (Boston Box) Analysis:

- **Wild Cats** have enormous potential, and associated risk. We accept that the majority of wild cats may fall, but those that succeed can have a dramatic effect on the organisation.
- **Stars** are systems which are growing in importance with plenty of future potential. They need the maximum investment. In supplier relationship terms, these are the **partnerships**.
- **Cows** are systems which continue to provide good returns, but have no future potential for growth. We should invest in these only to the extent of maintaining them.
- **Dogs** are systems with no growth potential and small returns. We should minimise invest in such systems or the supplier relationships which they represent.



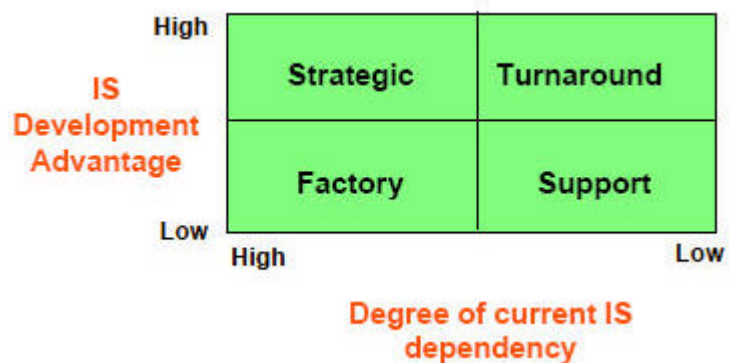
There is a natural progression of investments. If we correctly identify Wild Cats we can turn them into Stars which will eventually settle down into Cash Cows.

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Classification of Information Systems

Yet another way of thinking about systems and the degree to which we might invest in supplier relationships is shown by this matrix.

It is functionally identical to the Boston Matrix, but the terminology is more like that used in hierarchy shown previously.



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The Prisoner Dilemma

Another way to view the supplier customer relationship is through the **Prisoners' Dilemma**. This is a famous theoretical game which models many aspects of relationships between 2 or more organisations.

It was originally used by the Rand Corporation to model US/Russian options during the Cold War.

The essence of the Prisoners Dilemma is that it is a non-zero sum game.

This means that it is possible for both players to win, or both players to lose or one player to win at the expense of the other.

The name of the game is derived from the dilemma faced by two conspiring criminals picked up by the police. The prisoners are interrogated separately.

- If a prisoner admits his guilt and informs (defects) on the other he will get a light sentence.
- If both prisoners say nothing (co-operate), they will both be freed.
- If both admit guilt (defect), both will be punished, but more lightly.
- If a prisoner does not admit guilt but his partner does the first prisoner will be punished very severely.

	co-operate	defect
co-operate	3 , 3	0 , 5
defect	5 , 0	1 , 1

This is summed up by the pay -off matrix.

It is easy to establish the optimum strategy for a single round. The problem of determining the optimum strategy for the iterated (repeated) Prisoners' Dilemma remained (and remains) intractable. The iterated game is interesting because it is assumed that both players can maintain total knowledge of all the previous rounds and can employ any strategy to determine their next move.

In order to find some good strategies, the US government decided to mount a computer tournament in which programs played each other. Any strategy (in the form of a computer program) could be entered, and many were, including some extremely complex systems. There were no real limits placed on the size of programs or the time for computing a move or the amount of data available in advance or generated during the tournament. The winner of the contest was a strategy called **tit for tat**, (entered by a Canadian psychologist) which was incidentally the simplest strategy of all and needed about 6 lines of code.

In this strategy the player always co-operates first, then does whatever the other player did in the previous round. Despite its simplicity, this strategy won because it tended to manipulate the relationship into mutual co-operation even if the other player occasionally defected.

The result surprised everyone. A second tournament was arranged for the following year. This time everyone knew that **tit for tat** was a good strategy, but the result was still the same, **tit for tat** won. Even more surprise. A lot of theoretical work has been done on this since !

There is a parallel here with the supplier/customer relationship.

Clearly the best strategy is not to co-operate under all circumstances, since this will be realized and exploited.

Given that we want to make the best use of our investment in the relationship **we want to maneuver the supplier into mutual co-operation.**

Tit for tat is a reasonable model to use in achieving this goal.



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Communication with Suppliers

It should be recognized that it is critically important that communication with suppliers is through a well defined single channel.

Problems have often occurred when the supplier chooses the channel in order to maximise their advantage.

It should also be remembered that all communication with the supplier should be in commercial confidence (in both directions).

Service Level Agreements are the basis to ensure that both parties agree to the terms of the relationship and that the results of the relationship are measurable in quantifiable terms.



"Communication across the whole of your project is not easy when everyone has their own interpretation of what should be done"

Discussion Question 9.4: Before continuing, What are your own experiences in dealing with suppliers of IS solutions and services both locally and internationally. Identify problems that you have encountered, and how those problems were solved or could have been solved looking back on the surrounding circumstances remembering that confidentiality must be maintained at all times.

How would you undertake the same acquisition differently if it had to be repeated? Post your answer on the Discussion Board.

[GOTO TOF](#)

Service Level Agreement (SLA)

Service Level Agreements (SLAs) are intended to define what a customer or user of a service can expect from a supplier or provider of the service. They can be used where two separate organizations need to deal with one another, or where different departments in the same organization are involved. They are often drawn up when a manager has insufficient or inappropriate direct reporting staff or skills himself, and requires to utilize resources from another department.

The agreements should also define what the users or customers' responsibilities are.

It is not uncommon to find SLAs written by an Information System Services provider and not agreed or understood by the user. They should be drawn up to ensure a common understanding of the service required by customers and not intended to be contracts. They should also be **living** documents which are amended regularly to reflect changes in the business needs.

In effect the process is simple customer and provider agree suitable targets for service provision within existing resources. These are then measured and any discrepancies are discussed and explained openly. If there are regular problems with the delivery of the service against targets then information is available to request and justify additional resources.

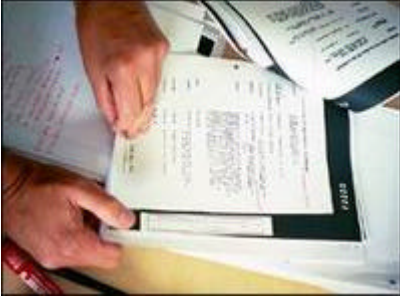


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There are no standard templates for Service Level Agreements, as the contents are dependent on the actual situation concerned. However, there are a few basic principles that need to be considered.

- What is the purpose of the SLA? Why is it necessary?
- What is covered by the agreement both systems and services, and to some degree, what is not covered. This will assist with clarifying any possible ambiguity, should a dispute arise.

It could be based on a tiered set of services, where some are provided free of



charge, and some are charged for.

- What are the responsibilities of both the user of the service and the provider of the service and who arbitrates?
- What are the targets for service levels in terms of time, cost and quality these should be stated in measurable terms, and the mechanism for measurement should also be included.

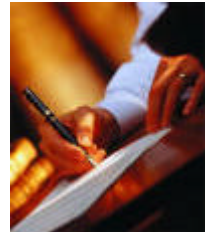
As this is a living document, details of the process required to amend the agreement should also be known and documented.

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A Service Level Agreement is more than just a piece of paper.

It provides:

- a common understanding of business and service requirements;
- Improved focus on business needs within an Information System function;
- management information available on performance against agreed measures;
- enhanced co operation between customers and service providers;
- budgetary input for increased resources;
- improved working relationships.



Service Level Agreement - Performance Assessment

Once a Service Level Agreement has been agreed and signed up to by both (all) parties concerned, it is necessary to set procedures in place for monitoring the performance against the agreed terms.

The measures that have been agreed should be meaningful, and easy to collate and assess. Good performance results should be publicized in both departments immediately to enable a positive effect on morale and incentives to take place. If the results are not as good as expected, then discussions need to take place without delay to agree corrective action - it may be that the Service Level Agreement is not viable - and until additional resources can be found - a lower level of expectation is necessary.

In all cases, **regular formal review of the SLA is necessary** to determine any required amendments due to changes in the business environment.

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Resource Management - Managing Internal Resources

The objectives of this session are to enable the students to understand how to recruit, manage and appraise individual staff members, and also how to deal with other colleagues, where there is no direct management line.

We deal with the challenges of getting the right number of staff of the right calibre, and keeping them once they are employed.

In particular to:

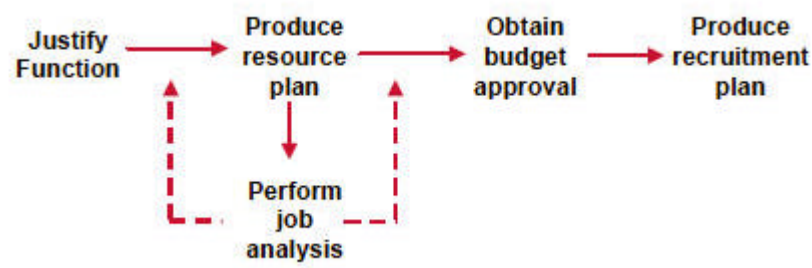
- identify resources required to carry out a given task;
- describe the most commonly used selection procedures;
- list the main pitfalls in interviewing;
- describe the goals of an appraisal system;
- identify the skills needed by a competent manager in these areas.



We also look at outsourcing to another department within the organization.

Justification and Job Analysis

For an organization to survive, each function must be able to justify its existence. An effective way of doing this is to produce a mission statement as described in earlier lessons.



Once the functional role is understood, the production of the resource plan can begin.

This will identify the positions and roles both of individuals and the overall department.

The plan should be capable of response to challenges such as:

- What would be the effect if this job function was not done?
- Can it be devolved?
- What value does it add?
- Does it grow with the job holder?
- What changes have brought about this need?

It will be necessary to analyze each position individually. This will be an iterative process, with numbers and structures changing as the situation becomes clearer.

Job Analysis - Competencies

A careful analysis of each position will identify the various competencies needed for each task; it can be helpful to tabulate these as shown on the table:

- **Job-specific** competencies are those needed to perform a given job effectively.
- **Management** competencies are those needed to interact with the work force, especially those whom the job holder will be responsible for,
- **Corporate** competencies are those which are specific to the nature of the organisation itself.

Job-specific		Management		Corporate	
Task	Time %	Task	Time %	Task	Time %

Candidate Requirements

The means of identifying suitable candidates needs to be established as part of the re-sourcing plan. These should be defined in terms of

- **Qualifications** - appropriate to the task. Academic qualifications are only appropriate to certain type of task, and can often be a negative qualification.
- **Experience** - making sure that this is real experience from which the candidate has learned. As the question goes "does he have twenty years' experience or one year's experience repeated twenty times over?"
- **Personal qualities** - behaviour patterns can vary widely between equally qualified candidates. Task specific aspects such as pressure or repetitive routine need to be considered
- **The job profile** - mobility needed, unsociable working hours, working alone for long periods, jobs in which performance is very much in the public eye will also have a significant effect on the right person.



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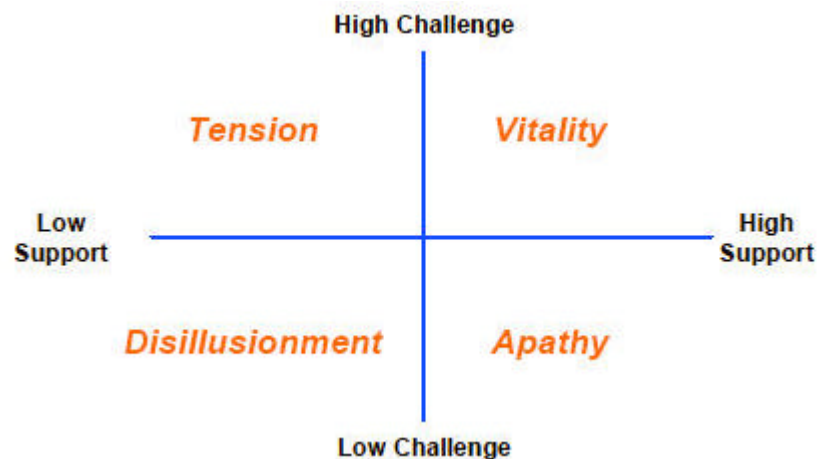
Working Environment

The job profile can be determined by a close analysis of the working environment, using a model such as that shown.

The vertical scale represents the degree of challenge.

The horizontal scale shows support available and received.

The response that would normally be expected is shown in each quadrant, and helps identify the sort of person who would fit into this type of environment.



The main value of this type of analysis is the identification of unsatisfiable aspects of the job which might prevent it being resourced at all, and to rectify them.

Unless you know how the best candidate would perform in the job,
it will be impossible to recruit him or her !

It follows that this aspect must be considered seriously before the rest of the re-sourcing process is initiated.

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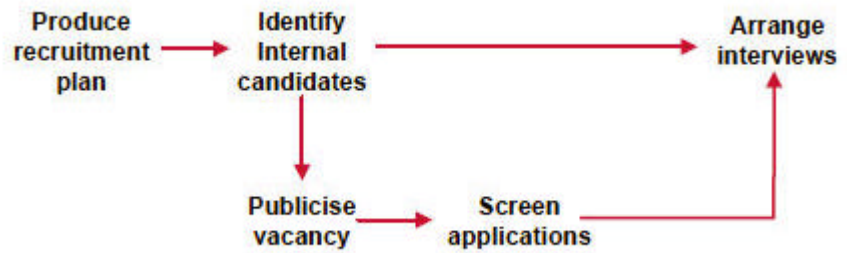
Recruitment Plan

Recruitment can take a very long time indeed, and it is best to follow an established process.

There may be many sources of applicants not necessarily all from outside the organisation.

Internal promotion can be the most cost effective means of filling a new job and there are an increasing number of specialist organisations who will

perform a large part of the recruitment task, such as head hunters and recruitment consultants.



Publicising the Vacancy

When considering the best way of publicising the vacancy, it will be necessary to consider many aspects:



- Rules / laws there may be many of these governing what can and what cannot be said in a job advertisement, and what restrictions cannot be placed on recruitment because they would be seen to be discriminatory;
- Attractiveness the initial advertisement will give a strong impression of the organisation if it is cheap looking, badly worded or boring, it will not attract the best candidates.

- Job requirements should be clearly stated in plain terms, encouraging those who are qualified and discouraging those who are not. For instance, if the Job is for a translator from English to Chinese, an advert which used both those languages would act as a useful pre selection mechanism.
- Audience and affectiveness making sure that the advert will be read by its target audience. It would not be likely to be an effective strategy to advertise the job of Football coach in a needlework magazine!

[GOTO TOF](#)

Screen Applications

The objective of the screening process is to select applications whose attributes are good enough to justify them being interviewed. This requires the decision criteria to be clear, in order that those who meet the criteria stand out from the crowd.

It is best to aim for a two stage process in this, perhaps making a short list of 3-4 with a reserve of another 4 depending on the closeness of the match of attributes to requirements.

It is only basic politeness, and an absolute must do to thank all applicants, to keep them informed, and to let them know of your decisions very quickly. One day, they may be interviewing you!



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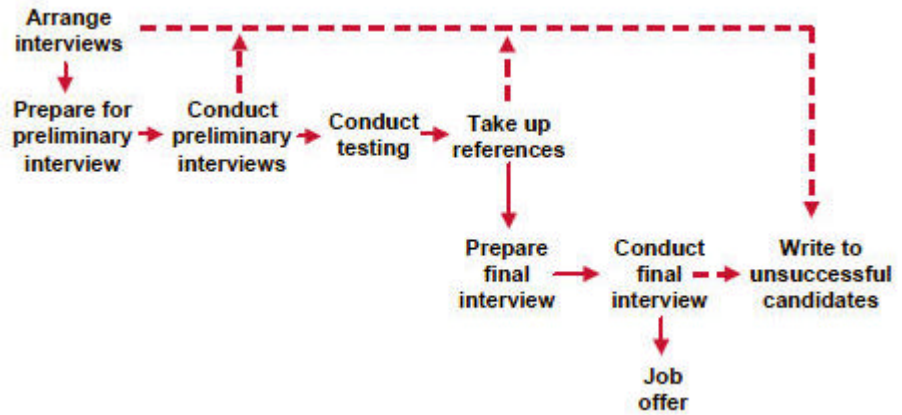
The Interviewing Process

In a large organisation, there may be many people involved in the interview process, so arrangements should be made in good time.

Scoring systems may be used, but they should not be applied too rigidly; instead they provide a discipline within which the process can be flexible.

All interviewers should:

- be fully briefed about the job requirement ,
- receive details of all the candidates,
- agree in advance what assessment criteria should be used;
- clarify any specific interviewing roles required.



It is essential that the criteria and method of assessing relevant attributes of interviewees is agreed in advance.

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Interview Preparation



Preparation should not be rushed or performed without due care.

In order to attract candidates who are right, and to make sure they agree to join the organisation, it is important that they should see an efficient and impressive view of the organisation, and the interview procedures will be an aspect of demonstrating this.

Preparation will help the interviewer to answer questions, and to sell the job. General company information should also be available.

Conducting Preliminary Interviews

In conducting interviews, it is important to:

- make the candidate feel welcome and explain the procedure;
- understand that both parties will feel stress in the interview situation;
- convey enthusiasm for the organisation and look for this in the interviewee;
- use specialists in order to check abilities if, for instance, the job has a high technical content or other specific need.

Integrity is important at all times.

The best person to recruit will be one who is happy in the job he/she will not perform well if enticed by unrealistic or unachievable promises.



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Next Steps

Testing

It may be that a degree of testing of behavioural characteristics and/or aptitudes may be necessary to make up for deficiencies in the interviewing process, and it is usual to list the help of professional specialist if this is required, since the interpretation of most of the worthwhile tests needs experience and specific knowledge.

References

Referee names are only likely to be given by candidates of people who they think will make favourable statements.

Nevertheless, they are worth contacting, if only to confirm the accuracy of some of the particulars submitted. The candidate's current employer should not be approached without the agreement of the candidate.

If academic qualifications are important, confirmation should be sought direct from the candidates university; false certificates are not difficult to obtain, and false claims are often made.

Final Interviewing

Final interviews need even more careful planning than the preliminary interview.

All the candidates who get to this stage will be acceptable; the purpose is to choose the best one.

It is imperative that the candidate be interviewed by his/her prospective manager, since the wrong chemistry between them could rule out an otherwise acceptable candidate.

It must be remembered that it is never acceptable to discriminate on the grounds of race, sex, or disability unless these relate directly to specific requirements of the job.



At this stage it is also necessary to finalise conditions of employment, timetable, and all other terms and conditions.

Normally, a first and second choice candidate is identified.

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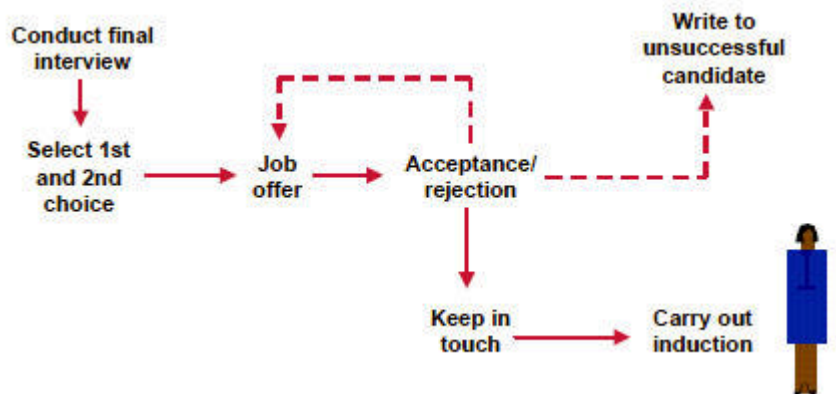
The Job Offer

An offer of employment should be sent to the first choice candidate. All other candidates should be thanked for attending the interviews. It is a good idea to inform the second choice candidate that the application is still being considered.

The offer should clearly state any conditions which apply, and stipulate a date by which it should be accepted.

It is wise to maintain contact while the candidate is working out the notice period with the existing employer.

It takes a great deal of money to find the right person.



A good induction process makes sure that he/she gets off to a good start. The recruit must be made immediately welcome, with office accommodation and whatever other equipment is needed.

Training and introductions should be arranged, and the new person should be given time by his/her manager in order to feel valued and become an accepted full member of the team.

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Appraisal

Once recruited, it is necessary to make sure that the person develops and maintains an effective contribution to the team. The appraisal process is the way in which this is achieved.



The appraisal system is a management tool, and has been defined as the means by which a job holder and the job holder's supervisor take time to talk freely and fully about the way in which the job holder performs the required task, and to establish plans and priorities for the future.

Note that it is a two way process, and is not merely about delivering a couple of reprimands and informing the person about next years pay rise. It is planned, not a casual conversation; it looks ahead whilst not losing sight of previous performance; it does not restrict itself to details, but takes a broad view.

Good appraisal systems are a major opportunity to maintain an effective and committed workforce whose personal objectives are aligned to the organizations and supported by it.

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Effective Appraisal

Appraisals cannot be conducted in a vacuum, they should be supported by other organisational systems and conform to its culture. These include the management of personnel records and training processes, to ensure that all such recommendations are followed up.

The most important aspects needed for effective appraisal are openness of both parties to listen to the other's point of view, and a commitment from both to wish to improve, develop, or change if necessary.

It should also be noted, that it is bad practice to wait until the appraisal, if there are serious issues that need to be addressed by an individual, or indeed if praise is deserved.

These issues should be dealt with as an ongoing management activity.



Openness needs to be made apparent - it cannot be simply assumed that the employee will trust the organisation implicitly. There should be no closed files or confidential material which is not accessible to the employee.

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Timing of Appraisals

The appraisal cycle should be regular, but the actual timing can vary.

- At a **fixed time of year** - focusing the whole organisation for a common period, and allowing training and action plans to be included in budgets, salary reviews and annual planning.
- To **coincide with the job-holders anniversary** with the company - spreading the time needed for appraisals more evenly across the year, but possibly lessening its perceived value.
- On an **ad-hoc basis**, such as change of job responsibility, recognised performance problems or other such issues.

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Setting Up the Appraisal

The appraisal should be set up by the **job-holder's supervisor** and should be treated in a way that **reinforces their importance**, with **clear and accurate objectives** being communicated to all parties.

Plenty of time should be allowed; and it is poor practice to allow appraisals to be moved around or be rescheduled because of other priorities.

Approach to Appraisal

It is the responsibility of the supervisor to set the tone of the appraisal, who should take care to make this positive and businesslike without being formal.

- Stress Confidentiality
- Reinforce Importance
- Focus on the Future
- State Process and Objectives



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Appraisals Content

It may be that other managers should be given the opportunity to comment on performance, but the appraisal should normally be on a one to one basis.

Appraisal contents should include:

- **Successes / failures** - a brief review of the previous period since the last appraisal, paying equal emphasis to successes as well as failures and the reasons for these;
- **External factors** - what things outside the job-holder's control had an effect;
- **Results obtained** - against previously agreed objectives, and against the action agreed at the last appraisal.
- **Probe for the real reasons for poor performance** - what needs to be/can be corrected in order to eliminate the cause is there a need for more training, better advice or closer management?

The Appraisal Interview

In the interview itself, the job holder should be encouraged to comment freely and say what he/she really feels in an open manner, with the interviewer not being defensive and ready to admit error.

Additionally, the effects of culture should be noted some people find it very difficult to operate in an open manner, feeling this to be impolite, and the interviewer should be aware of this.

A good line of questioning might be:

- "If you were asked to do this again, how would you approach the task in order to improve on last time's performance?"



The interviewer should pay attention to actions which can be seen to lead to direct and measurable improvement, in which both parties can see positive outcomes.

At the end of the appraisal, the interviewer should summarise and check understanding, noting the actions agreed and the priorities for these.

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Concluding the Appraisal

It is also important to state how the agreed actions will be monitored there is nothing more frustrating for the job holder to see nothing actually happening as a result of the appraisal, and this will very quickly negate the effectiveness of the process.

Appraisal Problems

There are many problems which might prevent an effective appraisal:

- **Organisational** - poor follow up administration, no commitment from senior staff, no training in appraisal technique, poor change management.
- **The appraisal system** - either too rigid or too informal, inconsistency in approach, use as a disciplinary procedure or simply as a means of deciding pay rises.
- **The interview** - insufficient preparation, many interruptions, insufficient time, hidden agendas on both sides.
- **Attitudes** - the parties having foregone conclusions, based on bias or prejudice, judgmental attitudes.
- **Behaviour** - avoidance of issues, aggressive behaviour, insincerity, or even dishonesty.

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In summary, the aims of appraisal are to:

- review the past;
- set goals for the future;
- identify the actions needed to enable Improvement.

The essential skills are the ability of the supervisor to truly hear what is being said, and to be able to look at the issue not only from the management point of view, but also that of the job-holder.

Resources

Interpersonal Skills Goal Directed Behaviour at Work , by John Hayes, ISBN 0 04 445 550 3

Links

[Project Management Glossary](#)

Lesson 10 - Leadership

Principles of Human Behaviour - Leadership | Leadership Styles | Leadership Conflicts | Managing Motivation | Motives | Maslow's Hierarchy | Herzberg Factors | MacGregor Theory X | McClelland's Thought Patterns | Motivation Profiles | Preferred Learning Styles |

Principles of Human Behaviour - The Team and its Role | Winning Teams | Team Development Stages | Balanced Team | Team Member Types | To be a Good Team Member ... | Leadership | Types of Leaders | Action Centered Leader | Developing Team Skills |

Principles of Human Behaviour - Leadership



This session looks at the nature of leadership and teams, describes the various leadership styles appropriate to team management.

We also discuss the principles of motive and motivation, and describe the most relevant theories of motivation in the work environment. It discusses the concepts:

- What are motives?
- What is motivation?
- Why does it matter?

We also discuss the various learning styles, and undertake a self assessment exercise to determine our own preferred learning style, and how that affects the way we behave with others.

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Leadership

Discussion Question 10.1: Before continuing, name leaders who they feel have been very effective in the past, and describe what characteristics they exhibit in common. Post your thoughts on the Discussion Board.

The common general characteristics of these leaders will almost certainly include:

- single mindedness almost to the point of stubbornness;
- excellent communication skills;
- self belief,
- very strong sense of purpose;
- charismatic in the sense that they found it easy to attract a following.

Note: that this list does not mean that all of them were necessarily good contrast, for example, the lives of, say, Martin Luther King and Hitler but it does show that these essential leadership characteristics are displayed in conjunction with the personality of the leader.

The leaders behaviour will demonstrate how that personality applies itself alongside the chosen purpose to give a behaviour pattern in a given situation, with a leadership style ensuing from this.

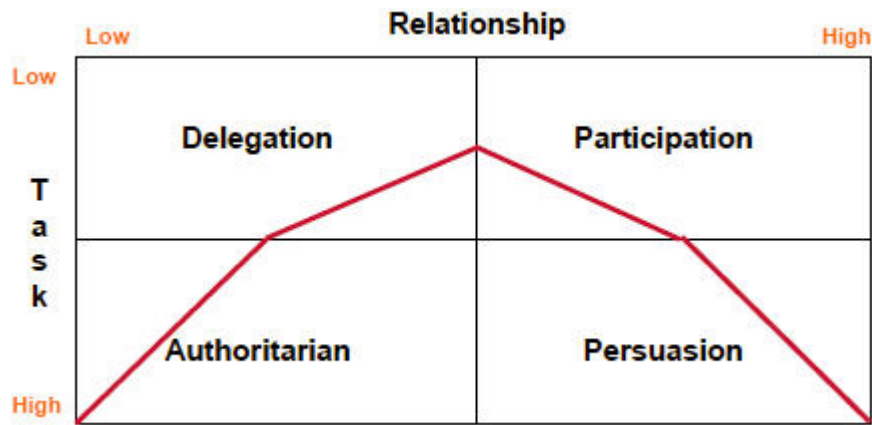


Discussion Question 10.2: What are the characteristics of some current well known leaders in society, and how is their performance measured, both by those that they lead, and by the world at large. Post your thoughts on the Discussion Board.

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Leadership Styles

There are many ways of categorizing leadership style; one useful method is to look at the way in which the importance of relationships are set against the need to complete the task.



Delegation	Participation	Authoritarian	Persuasion
Low task	Low task	High task	High task
Low relationship	High relationship	Low relationship	High relationship
"I see this task as unimportant, uninteresting or beneath my dignity, and I don't care about who does it"	"I am not particularly concerned about the task, but relationships with the people for whom I am asked to do it, or who I am doing it with are important"	"I don't care about the people, I just have to get the job done"	"The job needs doing, but I care about building an ongoing relationship with the team as well"
will result in an approach which either delegates or gives away the responsibility for the task altogether.	will give rise to a participatory leadership approach.	will result in an authoritarian style, where the leader simply tells people to do the task without regard to their view of it.	will result in an approach in which the team is persuaded given an incentive, a motivation, and perhaps also a rationale for doing the task (the team possibly even being part of the process of objective setting).

Motives and incentives are to be examined in a bit more detail later on in this lesson.

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Leadership and Relationships

"Put your people first, above the board of directors, even ahead of the customers and above the world."

Sir John Harvey Jones

The leader is employed to get a job done through people he/she has control over.

Without them, there is no team to lead, and nothing can be accomplished at all.

No matter how important are the customers, directors, or anybody else

- if the manager does not lead the team, none of them will get anything delivered at all.

Sir John Harvey Jones, ex-chairman of ICI articulated this in the quote given on the visual - and the same view has been repeated by many other business leaders both before and since.

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Leadership Conflicts

The leader's responsibility, irrespective of the level of seniority, is to balance a set of objectives and it may well be that there are conflicts between these which need to be resolved.

A breakdown or neglect in one area will affect the others, and prevent the job from being done as effectively as it could be.

The prime objectives of the leader are to:

- **achieve the task** - to get the job done by planning, allocating resources, controlling the work done, monitoring against the plan and taking the necessary and appropriate corrective action;
- **develop individuals** - attending to personal problems, praising individuals, giving status, recognizing and using and continually working to improve individuals abilities;
- **build the team** - setting performance standards, maintaining discipline, building team spirit, encouraging, motivating, giving a sense of purpose and training the people as well as at all times working to improve communication with the group;
- **achieve personal objectives**- leaders should not forget that they themselves have a responsibility to their own career and personal objectives, and that no team wants to be led by a leader who does not show a degree of personal enthusiasm and ambition.



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Managing Motivation

The next part discusses the principle of motive and motivation, and describes the most relevant theories of motivation in the work environment. It discusses the concepts:

- What are motives?
- What is motivation?
- Why does it matter?



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Motive

A thought pattern with feelings and values which leads to energized behaviour !

To be motivated is to be energized into action.

Our thoughts precipitate our actions.

Thinking, feeling and acting are three essential elements in motivation.

We should look at each of the components of this definition in detail.

Thought

A motive is a thought..."; and is therefore: internal,
i.e. it occurs inside your head, and thus cannot be:
seen; touched; smelt; tasted; sensed,
directly by anyone but the one who has the thought.

Motives are totally individual. One experiences them and is solely responsible for them. This is important; since motives are thoughts, one can learn to control them

Pattern

The stray, random thought which surfaces unbidden in your mind for a moment only to disappear is not a motive.
Motives may arise singly, but they are not stray or random instead they belong to a pattern.
This pattern is recurring and may well have been Present in childhood,
i.e. a thought habit, which powerfully influences behaviour.

Feelings

The literature of many cultures places the source of our feeling not in the head but in the heart.
Despite the devaluing of subjective, emotional, sentimental and non-scientific language in modern culture, the heart still remains metaphorically the source of our emotions.

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Feelings

Feelings can be positive or negative, and are needed to transform the thought pattern into a motive. Alone they will never produce energized behaviour.

When a motive is present one feels different. Negative feelings are as much an indication of the presence of a motive as positive ones.

This is important.

Positive	Negative
<ul style="list-style-type: none">• Aroused• Challenged• Excited• In Love• Protected	<ul style="list-style-type: none">• Rejected• Fearful• Shamed• Violated

Motives do not necessarily make one feel good.

To be motivated might mean that one is filled with fear, anguish or anger. Other motives might be wishes to avoid pain or punishment, hunger or death.

However, without feelings, positive or negative - there are no motives. Feelings are necessary for the creation of motives.

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Motives

Motives can be functional or social.

Functional	Social
<ul style="list-style-type: none">• hunger• thirst• warmth	<ul style="list-style-type: none">• interaction• creativity• opportunity• challenge

A functional motive is a motive which relates primarily to bodily needs or functions such as hunger, thirst, warmth, etc. e.g. passing a hamburger shop makes one feel hungry, and begin to think about how long it was since the last meal.



- The behaviour associated with a functional motive is often more compelling than a social motive, since the functional motive has to do directly with physical well being and survival.
- A social motive relates to interactions with the world around, its opportunities, its challenges, and its people.

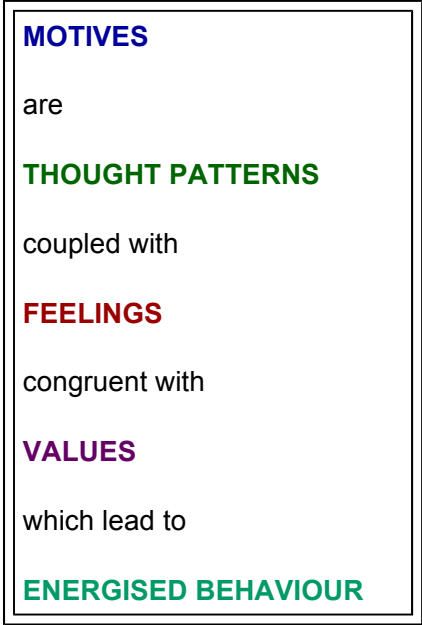
As an example of the difference, it is a functional motive if I think of satisfying my hunger with a three course business lunch and go off to my favourite lunch spot. The social motive may drive me to think I do not want to eat alone and invite three people to join me.

Behaviour is not a random response, it is a goal directed to respond to the opportunities created by the situation.

If the thoughts and feelings cannot be translated into goals, then one is likely to become confused, frustrated or depressed.

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Motivation



The visual illustrates... the ideas inherent in the definition of a motive and shows the flow that links motives and behaviour.

In this context, behaviour is an observable action.

People will often speak of somebody being motivated when extra effort is put into a task. However, strictly speaking, all behaviour is motivated, even turning the page of a book.

The term motivation is widely misunderstood and misused.

Phrases such as:

She has lost her motivation for the piano, are wrongly used to describe someone who is no longer behaving with commitment and energy. What exactly is no longer there? Behaviour is still there. She still plays the piano, but her playing is not of the same quality which caused us to describe it as motivated.

So, what is lost?

Behaviour is influenced by many variables - thoughts, feelings, values, energy, health, etc. - the person may have lost any or all of these, but what she has not lost is her motivation.

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Motivation is the process by which thoughts are translated into goal oriented behaviour.

This leads to a definition of motivation as the process by which thoughts are translated into goal oriented behaviour, and

this provides the key to the *why* of energized behaviour.

Motivation deals with the stimulus and response of human beings of all temperaments and backgrounds in all situations.

There is a real danger therefore in over-simplifying the subject. However, vital factors can be isolated to show how management practices can be modified to utilize new understandings of human motivation in relation to work, especially given the modern belief that work can be understood as a basic human need and a source of intellectual fulfillment rather than the commonly held view of work as some form of punishment.

New patterns of leadership are illustrating ways to structure jobs such that accomplishment contributes to the goals of both individual and organization. Each investigator in the field of motivation has approached it in a different manner and concentrated on only a limited aspect of the total subject.

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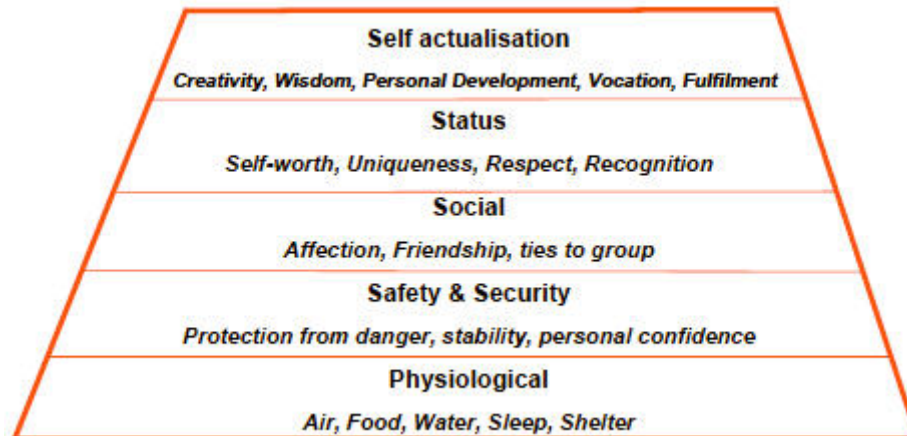
Maslow's Hierarchy

Abraham Maslow, a behavioural psychologist, suggests that when people “malfunction” it is because they cannot meet their needs through constructive and socially acceptable behaviours. Managers must realize, he says, that employees work efficiently and produce beneficial results only as long as they are also satisfying their own needs.

Maslow states three principles that are still widely accepted as the foundation for research on human motivation:

- **People are needing animals.** They seek to satisfy their needs in a certain order. As soon as one need is satisfied, another will appear in its place.
- **A satisfied need does not motivate.** Only an unsatisfied need can provide motivation. A starving person can be made to do things in promise of food, but food will not motivate a person who is in the middle of his third day at a Roman banquet.
- **Needs can be thought of as arranged in a hierarchy of importance.** Each of us has a predetermined order of needs, each with its own rank and level of importance to each individual.

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Maslow identified five levels of need, classified under two general headings:

Primary needs (psychological and safety) and

Secondary needs (social, esteem and self-actualization or self fulfillment).

The visual shows these needs in their hierarchical relationship

- **Physiological needs** - These are the basic needs to ensure survival, for example, food, warmth, shelter etc.
- **Safety needs** - These needs relate to remaining safe; in the industrial content, job security may be one of them.
- **Social needs** - These needs reflect a desire to feel loved and to belong. A feeling of being accepted as part of the team is an industrial aspect of this need.

- **Esteem needs** - The need to be held in esteem, a worthy and valuable colleague. Also the need for self esteem. To have status.
- **Self-actualization** - A psychologist's *buzz phrase* which can be interpreted as 'What a man can be, he must be' - a painter must paint, a writer must write, a runner must run.

Maslow postulates that these needs are only motivators when they are unsatisfied. He further postulates that these needs work, roughly, in the kind of hierarchy described above.

The lower order (**primary**) needs are dominant until satisfied, whereupon the higher (**secondary**) needs come into operation.

There is considerable intuitive support for this idea.

- If you are *starving*, your needs for esteem or status will be unimportant; *only food matters*.
- When adequately warm, further heat will not motivate you,

i.e. the need does not operate as a motivator.



The ideas postulated by Maslow have important implications for managers.

An employee's first needs are to earn enough money on which to eat, live and achieve a reasonable standard of living. Only when these needs are satisfied will he become concerned, progressively, about needing to feel accepted, desirous of esteem, and eventually, self-actualized at work.

It follows from this that, **before trying to motivate an employee, it is important to assess the need level at which an employee is existing.** For example, trying to persuade an employee that achievement of an objective will provide him with enhanced status, or job satisfaction, will have no motivational effect if he is worried that he is about to be made redundant; he is trying to satisfy primary needs (safety).

Similarly, more pay will not motivate an employee who has plenty of money, who is a respected and popular member of the team, but who needs new horizons and a fresh challenge. His primary needs are satisfied, and are no longer motivators; he is trying to self-actualize.

The scenarios described above are (relatively) long-term ones.

It is worthy of note that we all move up and down the hierarchy on a daily, or even hourly, basis as well.

For instance, a happy well adjusted employee who is usually committed to his job and highly co-operative, may well be rude or obstructive if asked, at 12.30 pm, to take a late lunch. This uncharacteristic behaviour might be due to the fact that he missed breakfast, and is very hungry. He has temporarily descended to a lower level of need and is more concerned about eating (a primary need) than to impress (a secondary need). After lunch, he will return to his usual need level, and be anxious to please again.

This is also referred to as **Theory Z**.

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Hertzberg's Hygiene Factors

There are many other theories of motivation, all of which can be useful to the leader in analyzing the most appropriate way of motivating the team.

Frederick Hertzberg identified two sets on needs, satisfiers and dissatisfiers.

- company policy
- supervision
- working conditions

satisfiers ?

Satisfiers are those needs that when met bring with them a sense of fulfillment and pleasure.

- salary
- status
- security
- interpersonal relationships

or

dissatisfiers ?

Dissatisfiers (sometimes called *hygiene factors*) cause dissatisfaction when not met, but do not necessarily bring fulfillment when they are met.

Hertzberg's view was that satisfaction does not come from work related benefits, but from what an individual does - to give is more satisfactory than to receive, provided basic needs are met and maintained.

Additional wages, bonuses, tea breaks or holidays will not produce the additional spark that leads to sustained energized behaviour. However, the absence of an adequate living wage and a healthy working environment will result in low energy and morale.

Hertzberg's Motivating Factors

- Sense of Achievement
- Recognition
- Meaningful Work
- Increased Responsibility
- Opportunity for Advancement

To provide motivation, Hertzberg suggests including in the work package a number of intrinsic factors designed to give the job a greater significance.

The job holder thus receives increased motivation as a result of greater self- and external recognition.



Frederick
Herzberg

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MacGregor's Theory X

Douglas MacGregor describes two theories of people at work from the perspective of management.

Theory X managers have a very **negative** view of the human condition, seeing their employees as basically lazy and good for nothing, people who need constant and close supervision in order to get a good days work out of them.

- People are lazy
- People lack ambition
- People are inherently selfish
- People are resistant to change
- Managers need to intervene or no work will be done

Theory Y managers, however, have a more **positive** view of human nature, believing that people want to do a good job - the management task is to provide the environment in which this can be achieved.

- People seek responsibility
- People need to work
- People want to do a good job
- Managers should enable

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McClelland's Thought Patterns

David McClelland - a student of Maslow - set out to validate Maslow's theory, but results were so disappointing that he devised a series of empirical tests which resulted in the production of a new theory altogether.

After studying a large number of people from more than nineteen nationalities over a ten year period, he identified that 80% of the time, people are driven by one of three types of concern which affect observable social behaviour.

During the remainder, they are concerned with primary needs which do not affect social behaviour.

He concluded that people are motivated by what they most often think about (ie. constantly think about food, motivated to eat more and more)

The three thought patterns he identified are the needs for:

- achievement;

- affiliation;
- power;



and these were labeled **Primary Social Motivation**.

Different jobs and responsibilities call for different kinds of motivation. It is therefore crucial for managers to know the motivation profiles of themselves and their team.

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Motivation Profiles

Characteristics of jobs requiring a high level of **achievement motivation** are:

- personal responsibility for goal achievement;
- direct performance related feedback;
- feedback is measurable and task achievement can be quantified;
- responsibilities and tasks are challenging;
- the job requires continuous improvement and access to experts.

Jobs needing **affiliation motivation** show characteristics such as:

- interpersonal skills and empathy;
- collaboration and co operation with many people;
- structures which rely on close relationships and mutual trust;
- non competitive (win-win) situations;
- jobs where reporting on success and failure - and intermediate feedback - is given and received at group, rather than individual level.

Management of such individuals is therefore a task in which each of these characteristics needs to be emphasized.

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Motivation Profiles - Power

A **power motivation** is more complex.

There are 4 distinct types of power as shown here.

The stages of power are influenced by the source of power - from self or others - and its focus - again either to self or others.

		Source of Power	
		Others	Self
Power Directed to:	Self	Dependent	Independent
	Others	Inter-Dependent	Assertive

Dependent people need to:

- assist in important endeavors
- look up to and respect their superiors;
- have responsibilities which entail being of service and help to more powerful people, eg customers or clients.

The **independent** category need:

- to be allowed to perform their job with minimum control;
- responsibilities that need a high degree of discipline and organization of tasks (not of people);
- tasks which require adherence to procedure.

Assertive people need:

Task Management

- to manage and motivate others;
- to be responsible for inspiring a team;
- taking leadership;
- respect, prestige and status.



The **interdependent** category encompasses:

- roles where one is primarily a figurehead, removed from every day activity;
- situations where the main Job is to delegate;
- jobs where enabling others is a priority;
- roles where it is important to act as an exemplar rather than a direct leader.

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Motivation Summary

Everyone has motives; the task of the manager is to enable the team to understand and engage with their own motives.

Motives are aroused by the situation; and different situations arouse different motives - when motives are aroused and aligned to the task in hand, people perform well.

**Everyone has a need for achievement, affiliation and power,
but at different levels in different situations.**



The more a manager can match the needs of a task to the motivations of the individual in the team, the greater the job satisfaction experienced and probably the better the job will be done.

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Preferred Learning Styles

Individuals are not always hostile or reluctant to receive a message, or learn a new skill, but if the sender of the message, or the lecturer/trainer consistently refuses to take care to make sure that the communication method and medium are appropriate they will soon become so!

Different people exhibit a range of preferences in terms of the way they receive messages.

Broadly speaking, there are four types of receiver preference, and each communication should be targeted to address these preferences.

If necessary, this could mean that the message has to be communicated differently to different people.



Activist



Theorist



Pragmatist







Reflector

Activity 10.1: Download Activity 10.1(pdf file) and complete the Learning Style Self Assessment Questionnaire. This is a formal assessment of your own learning style. Is this really how you learn?

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Working Environment

Pragmatist 	Likes <ul style="list-style-type: none"> • Clear linkages • Tackling real problems • Opportunity to practice/implement immediately • Repeatability 	Dislike <ul style="list-style-type: none"> • Talk/Chalk • Theoretical emphasis • Apparent lack of progress • Political/managerial or personnel obstacles to progress • No clear guidelines
Theorist 	Likes <ul style="list-style-type: none"> • Opportunity to analyze / generalize • Opportunity to probe basic precepts • Intellectual stretching • Well argued/interesting concepts • Complex issues 	Dislike <ul style="list-style-type: none"> • Emotion • Open ended or Irreconcilable problems • Being out of tune with others • No basic principle, policy or concept • No like minded people
Reflectors 	Likes <ul style="list-style-type: none"> • Stand back and observe • Allowed to think before action • Opportunity for further study • Structure 	Dislike <ul style="list-style-type: none"> • Cut and dried • Rushed activities • Lack of data • Forced to do a superficial job in the interests of expediency
Activist 	Likes <ul style="list-style-type: none"> • New experiences • Ideas without constraints • In at the deep end challenges • Excitement, drama, crisis • High Visibility 	Dislike <ul style="list-style-type: none"> • Listening • Solitary work • Repetitive activity • Precise rigorous specification • Attention to detail

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We have examined:

- the nature of leadership and introduced teams, and described the various leadership styles appropriate to team management.
- the principles of motive and motivation, and described the Most relevant theories of motivation in the work environment;

- the various learning styles.

Principles of Human Behaviour - The Team and its Role

Let's review team leadership styles and look further at the teams, making a successful team, and discuss the roles required in order that a team can be effective.

Winning Teams

Effective teams are never formed simply by putting people together.

A good team must be led and created by paying attention to building up a team with due regard being paid to establishing common purpose and relationships within the team, in the light of the attitudes and skills of the team members and the procedures and culture of the organization.



The characteristics observed in teams which have a reputation for consistent and effective performance are:

- **Common objectives** which are clearly understood, collectively accepted and, as far as possible, owned by the team members. No team or group of people can be effective unless they know what they are trying to achieve. Objectives need to be clarified and agreed by discussion and consensus. The more consultation that takes place in setting objectives and relating these to the teams perception of the situation, the greater the commitment by team members to making them happen, simply because they will have been involved and thus feel ownership over those objectives.
- **Roles** for all members which recognize and develop the skills they can offer the team. Most teams have a leader whose main role is to co ordinate the efforts of team members in meeting their objectives. Appropriate leadership style will vary according to the stage of development of the team, the requirements of the task in hand, and the leader's own personal abilities. Roles and responsibilities of the other team members will similarly vary; however, in order to be effective, **each** and **every** member needs to have a clear idea of their role and be committed to it.
- **Processes** for the way the team works which facilitate good decision-making. In the same way that objectives need to be clear, it is important to have pragmatic and effective processes for teamwork and decision making. Good teams collect information quickly and share it amongst themselves by putting it all "on the table". Problems are discussed openly, people listen to other's ideas, then make joint decisions to which all team member's are committed. Similarly, agreed procedures are required which enable actions to be carried out quickly and efficiently.
- **Open communication** structures which demonstrate mutual trust, co-operation, support and challenge. In an effective team the members can state their views, ideas and differences of opinion openly without risk of being ridiculed. This kind of atmosphere with no "stabbing in the back" leads to support and trust amongst members. In turn this generates co-operation from others. Members have no fear of sharing their problems and asking for help.
- **Networks** which build sound relationships with other groups. However efficient a team is it will have a limited degree of success unless it can link up with other teams:
 - What do we need from them, and are we getting enough?
 - What do they need from us, and are they getting enough?



In this way the work of one team will not be hindered by another team through lack of understanding of what the other is doing. This is directly comparable to people within a team achieving more by working together.

- **Evaluation** mechanisms which regularly review the team's performance and ways of working. Regular examination of performance enables the team to improve:
 - What can we learn from the past that will help us in the future?

This **process review** should look at the team's role in the organization., how it makes decisions, how new members are being integrated, as well as how it is performing task-wise. Additionally, there are also effective ways of looking

objectively at group processes including using a trusted outside observer, one team member, or the whole team.



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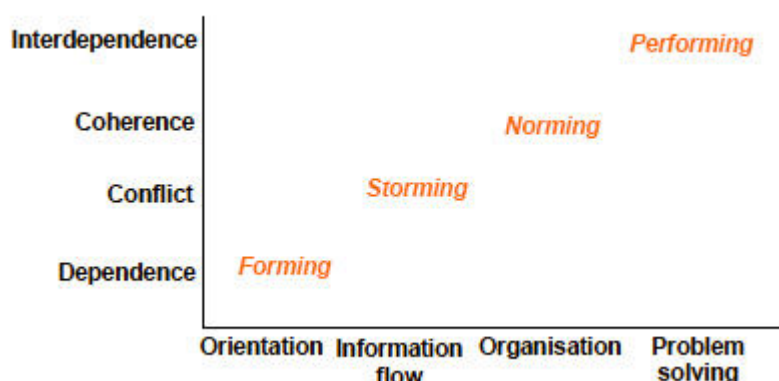
Team Development Stages

The characteristics of the stages through which teams develop can be categorized as follows:

- **Forming:** Silence, anxiety, dependent on a leader, concerned to receive structured task requirements and methods.
- **Storming:** Noisy, searching and comparing ideas, emotional, resistant to demands of task, more self-oriented independent behaviours, possibly rebellious against initial leader, sub-grouping (if size above about eight). Information generation, opinion seeking and development of early pairings and relationships.
- **Norming:** Re-emergence of task demands and more open exchange of ideas and views. More *listening* and co-operation, with rules of conduct and identity of group (also in regard to their relationship with other groups) developing. Growth of 'we' feelings, group cohesion, individual roles and agreement on work and decision making processes.
- **Performing:** Settled interdependence and problem solving - energy now directed at task requirements.

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Team Development Process



The four stages are shown here graphically, against the attributes displayed at each stage.

The extent to which any phase of this development process is experienced (and necessary) will itself depend on the level of interdependence required in the group.

It could be said that the higher the quality of the interdependence required, the more necessary it is for groups to spend time in the storming and norming phases, and indeed (as with any group in difficulty) to reiterate the norming and storming phases again if the deliverables from the performing stage are inadequate. At the extreme the only solution may be reforming - splitting up of groups and their re-grouping.

It is during the middle stages of group growth that the individual's knowledge and understanding (and possible tolerance) of his colleagues' skills, role preferences *etc.*, and the willingness to confront and deal with conflict (usually inevitable and necessary in creativity) are developed. Without it, group performance will often be experienced as strangely sterile, superficial and lacking in real commitment and depth.

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Balanced Team

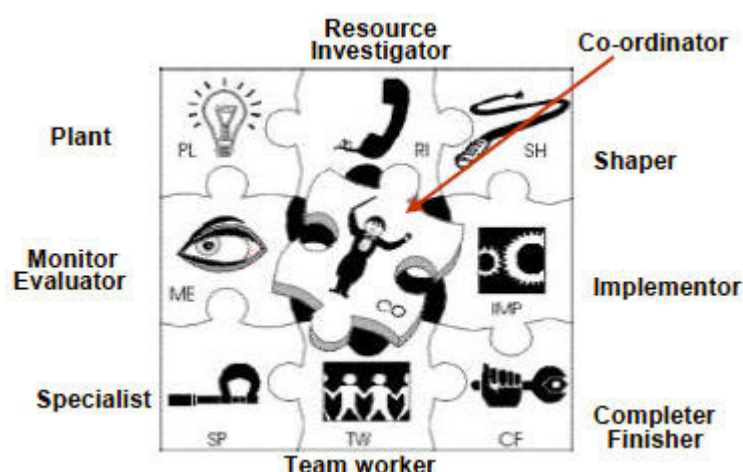
For a team to function at all, and to stand a chance of achieving the **Performing** status, it is necessary for the team to comprise of individuals with different characteristics.

Valuable research has gone into looking at the best mix of personalities in a project team. Belbin, studied teams working together on management games using various mixes of people. He initially tried putting all the people who were most able into one group. Surprisingly, these elite teams tended to do very badly - they argued a lot and as a result important tasks were often neglected.

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Team Member Types

Belbin came to the conclusion that teams needed a balance of different types of people.



The **Chair** - not necessarily a brilliant leader but they must be good at running meetings, being calm, strong but tolerant

The **Plant** - someone who is essentially very good at generating ideas and potential solutions to problems.

The **Monitor-evaluator** - good at evaluating ideas and potential solutions and helping to select the best one.

The **Shaper** - rather a worrier, who helps to direct the team's attention to the important issues.

The **Team worker** - skilled at creating a good working environment, for example, by 'jollyng people along'.

The **Resource-investigator** - adept at finding resources in terms of both physical resources and information.

The **Completer-finisher** - good at completing tasks.

The **Company worker** - a good team player who is willing to undertake less attractive tasks if they are needed for team success.

Taken from: <http://www.belbin.com/belbin%20team-roles.htm>

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To be a Good Team Member ...

A person can have elements of more than one type.

On the other hand, about 30% of the people examined by Belbin could not be classified at all.

To be a good team member - you must be able to:

- **time your interventions**, e.g., not overwhelm the others in the team
- **be flexible**, be prepared to take on board others' viewpoints.

- **be restrained**, do not force your ideas on the team without consultation.
- **keep common goals** of the team in mind all the time.



Activity 10.2: Download Activity 10.2 (pdf file) and complete the Belbin Self Assessment before the next chat session, so you can discuss the results with your instructor and colleagues.

There are numerous published "people" classification schemes.

Discussion Question 10.3: What are the benefits and potential pitfalls of classifying individuals and its use in improving team cohesion. Post your answer on the Discussion Board. You may wish to undertake some research to investigate this further.

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Leadership

At the beginning we looked at the characteristics of a successful leader.

Refer back to the beginning if you don't remember.....
[Leadership](#)

Discussion Question 10.4: Keeping those characteristics in mind, let's discuss the following questions:

- Should a leader be a **generalist** or a **specialist**?
- Should the leader have a **high IQ**?
- Should a leader **tell** team members what to do? Or just **inspire** them to do it?

Post your thoughts on the Discussion Board.



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Types of Leader

The role of a good leader, is essentially to keep an objective view of the whole project - its trends, problems and activities - from an informed viewpoint.

It is important that the project manager does not become, for example, the engineering manager or the construction manager on the project but stands back and ensures that engineering and construction are properly performed and managed.

Leader	Action
Mediocre	Tells
Good	Explains
Superior	Demonstrates
Great	Inspires

The ultimate leaders develop followers who will surpass them.

- Runners will become coaches and train other athletes who will break their records.
- Executives will motivate subordinates so successfully that they will become their superiors.
- And parents, in their devotion to a child, will pull him or her up beside them and then encourage the child to go even higher.



There are a variety of recurrent themes - all of which have come before us time and again as we have pursued the theme of the value of teams, and the role of the team leader.

Words and phrases such as "learning", "initiative", "experience", "being a good listener", "teamwork" and co-operation recur constantly. These are all essential elements in a good team, led by an effective project manager.

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The Action Centered Leader

Managers **should be assessed** for the **quality of their leadership**, but defining this in measurable and quantitative terms is not easy, **so managers are judged by their effectiveness as leaders**, which depends largely on:

- ensuring that allotted tasks are completed on time;
- creating and building a team that can deal with the task ahead;
- developing the team members by coaching, guidance and training;
- being quite clear about the task ahead, and making this clear to the team;
- understanding and explaining the way in which the task fits in with company objectives;
- planning with the team how the task is best accomplished; determining and then obtaining the necessary resources, indeed human resources;
- closely monitoring project progress;
- appraising the project following upon completion to learn the lessons.



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Developing Team Skills

Effective leadership is nothing more than plain common sense.

However, many leaders are completely unable to motivate their team members through encouragement and inspiration by word and by example. Perhaps they do not try, never having appreciated the need.



People are naturally self-motivating, but the opportunity has to be presented to them: **self-motivation has to be encouraged.**

The participation of team members must be real and put into practice through delegation and decentralization. This is the responsibility of the leader, and the action centred leader will see that it happens.

Discussion Question 10.5: What are your own perception of your ability as team member and team leader, and what targets should you set for yourself, and what kind of action plan might you put into place to improve on your own current skills. Post your answers on the Discussion Board.

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Resources

Interpersonal Skills Goal Directed Behaviour at Work, by John Hayes, ISBN 0 04 445 550 3

Gifts Differing: Understanding Personality Types - by Isabel Briggs Myers, ISBN 0 89106 064 2

Frederick Hertzberg - http://www.fact-index.com/f/fr/frederick_hertzberg.html

Theory of Motivation - <http://hosting.menonet.net/~khair1/khair1/Theory%20of%20Motivation.htm>

Douglas MacGregor - Theory X and Theory Y - http://www.accel-team.com/human_relations/hrels_03_mcgregor.html

Douglas McGregor - Theory X Y - <http://www.businessballs.com/mcgregor.htm>

Links

[Project Management Glossary](#)

Lesson 11 - Innovation, Quality and Productivity

Principles of Human Behaviour - Innovation, Quality and Productivity | When Opportunity Knocks | Rewarding Innovation | Creativity and Innovation | Successful Innovation | Innovation | Innovative Team | Innovative Team Leader | Problem Solving | The Need for Vision | Significance of Quality | Paying for Quality | An Attitude of Mind | Research and Development | Use of Incentives | Maintaining and improving Quality | The Need for Involvement | Performance Follows Commitment | You Get What You Expect ! | Enthusiasm is the Key

Principles of Human Behaviour - Innovation, Quality and Productivity

We will look at the human factors aspects of:

- innovation;
- quality;
- productivity;



and the need for involvement and commitment by all members of the team to ensure continued business success.

Discussion Question 11.1: "Why do innovations succeed and why do they fail ?" Post your thoughts on the Discussion Board.

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When Opportunity Knocks ...

Innovations and inventions seem to come at random, without planning.

At times, the idea seems to come knocking at the door most unexpectedly.

Behind these and other seemingly random inventions was an innovative team, not necessarily looking for the breakthrough they ultimately achieved.

Talking of the relationship between basic research and actual breakthrough, Ralph Gomory, on e-Time Director of Research at IBM said:

"A breakthrough occurs when the technological knowledge and a way to apply it to meet a need come together in one person's head.

Incremental steps forward are more pervasive than breakthroughs, but both are important.



Science can be thought of as a large pool of knowledge fed by the steady flow from the tap of basic research.

Every now and then the water is dipped out and put to use, but one never knows what part of the water will be needed.

Yet history shows that keeping the water flowing into the pool is a very worthwhile enterprise."

Despite the obvious random nature of research, it must be pointed out that in relation to investment in plant and equipment, investment in research is cheap. It is also crucial to continuing innovation, in that it provides the springboard from which so much innovation ultimately comes.

Discussion Question 11.2: Is there any innovation that has come about in your industry recently ? Post your answers on the Discussion Board.

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Rewarding Innovation

There is no doubt that those responsible for innovation should be rewarded appropriately. Rewards will

Task Management

produce positive results, although beware that it may not always be appropriate to reward financially.



All innovation should be rewarded, regardless of whether small or large, significant or insignificant. Whilst financial rewards for innovation are higher in the United States than elsewhere, Japan far exceeds any other country in the number of awards it makes. The premise is that a lot of small awards result in more attempts and suggestions from a wide cross section.

Give full support not only to the innovator, but also to the team.

Make a positive request for innovation, via the ideas box and similar approaches.

The manager must set the example in this, as in everything else. People will do as their manager does, not as he says. The manager must also remove obstacles and hurdles that are placed in the way of the innovators.



Don't be afraid of failure it is the foundation of success.

Thomas Edison said after a few thousand failures in his quest for an electric filament bulb that would work: "I must be much nearer my goal now that I know a great many ways that do not work!"



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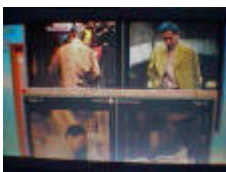
Creativity and Innovation

In order to innovate, one must be able to create. Creativity is associated with intuition, but there is often a problem in businesses of opening an intuitive channel that will support creative behaviour. Help can be obtained by applying the above constructive approach to problem solving:

- State the Problem
- Identify the symptoms - what information can we get ?
- Gather and share the information - what information is needed
- Generate ideas for possible solutions, which is the best ?
- Combine ideas to build solution
- Develop an implementation plan

It must be remembered that there is nothing to be ashamed of in taking another's idea and further developing and improving it displaying creativity and innovation.

Professor Kaoru Kobayashi is quoted in the Japan Times in 1984 as saying:



"When we want to do something, we just try to learn and absorb all possible answers, alternatives and developments not only in Japan, but in Europe, in developing countries and in the United States. Then, by combining and by evaluating the best of all this, we try to come up with the optimum combinations which are available. We are very sophisticated copycats...."

One can benefit enormously from the ideas of others, learnt in the marketplace, building upon their hard work and so saving oneself considerable time by not "*reinventing the wheel*". Perhaps we should all try to become "sophisticated copycats".

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Successful Innovation

One of the best examples of successful innovation is provided by the "**Post-it**" notepads now to be found in every stationery shop.

This innovation has proved a phenomenal success, with a turnover of US\$200 million for 3M, the company which manufactures the relevant adhesive, but it had an very inauspicious start.



It is said that a certain Art Fry, a chorister, used bits of paper to mark the paces in his hymn book, but was perpetually exasperated because they continually fell out. What was required, he thought, was an adhesive backed paper which would stick, but leave no trace when removed. In other words, what was wanted was a rather poor adhesive: surely that would not be too difficult. Nor was it: such a product was soon developed.

But strangely enough the market surveys were all negative, and the idea was all but given up. But then the 3M executives and their secretaries got 'hooked' and hailed it as a breakthrough.

Then the secretary to the chairman of 3M mailed samples of the new product to the secretaries of *Fortune*, the prestigious American magazine. They got hooked as well, and the product took off.

But notice that the breakthrough was not achieved by the management, but by enthusiastic employees, and this not until some twelve years after the idea had been first tabled.

Innovation is often not planned - it just happens, and sometimes in a very random, haphazard manner.



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Innovation

The Myth

Innovation can be planned

Market plan is a must

Big team is essential

Strive for optimisation

Customer knows what he wants

Technology brings success

It seems that **innovation** is inherently a **sloppy process**. **Accept that fact** and live with it, and reap the rewards. That is the reality, whilst the myth that is commonly believed is just the opposite.

It can be seen from the set of comparisons, that innovation has its own characteristics, and that these will evolve as an innovative project develops. What is going to happen cannot be foreseen or planned.



The Reality

It thrives on uncertainty

Move rapidly and experiment

Small team is far more efficient

Optimisation is a waste of time

Innovative product is usually ahead of the market

Listening to the market is what brings success

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Innovative Team

It can seem that innovative teams can be disruptive. They certainly need to be handled properly, and the best approach is often to leave them to their own devices once it has been determined that they have access to the necessary resources. The innovative team needs to be nurtured and encouraged rather than managed or controlled.

Task Management

Listed below are some of the major characteristics of the truly innovative team: they are not so dissimilar to the characteristics that have been outlined any other team:



- multifunctional
- undermanned and overworked
- between 5 and 25 fulltime members
- outward looking leader
- very few simple rules
- work for the fun of it
- complete autonomy



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Innovative Team Leader

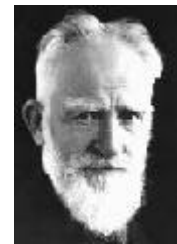
"The reasonable man adapts himself to the world:
the unreasonable man persists in trying to adapt the world to himself.
Therefore all progress depends upon the unreasonable man"

George Bernard Shaw

It seems that the leader of an innovative team has to be an outstanding character in some way: it appears he is often classed as *weird and even found to be unreasonable*.

George Bernard Shaw in *Man and Superman*, expressed characteristics of the unreasonable man: the man whom we expect to see an innovative team.

Also, the innovative leader thrives on challenge, and as a result, projects are often taken on with a low probability of success: yet he often succeeds.



Innovative leaders have a difficult life, meeting opposition from many quarters. Many questions are asked:

- "Why divert precious resources to a doubtful project?"
- "Why work overtime?"
- "Why disrupt a production line for a series of speculative experiments?"

The innovative leader rarely gets whole-hearted support until he has completed his project and it is a demonstrable success.

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Problem Solving

Problem solving often plays a substantial role in innovative thinking. Any problem is created by a gap that exists between what is and what ought to be.

Unless solved, a problem can lead to frustration, anger and anxiety. This, naturally enough, results in lowered output and a fall in productivity. Also, a problem left unsolved has a tendency to multiply itself. A positive approach to problem solving is called for, and the team leader should always pay the most careful attention to such problems that are brought forward by the members of the team. Problems should never be ignored or set on one side as unimportant.



Also, other team members should not be ignored, and wherever possible the solving process should be a team activity. The leader should facilitate the process of problem solving, rather than trying always to solve the problems unilaterally.

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The Need for Vision

Task execution calls for very close attention to detail. The task leader is not directly concerned with the detail: that is the responsibility of others, yet he/she must be broadly aware of the detail. He/she must certainly be looking ahead towards the completion of the task immediately in hand, but should also be looking further than that.

He/She must have vision. He/she have to look ahead of what is going to come after, both for himself and for all the members of the team. They all must have a future.



It is important to realise that no one knows what the future holds. Forecasting in business is often based on analysis of historical and current trends, then making projections and predictions, but even those who have devoted their entire careers to this can still get their predictions entirely wrong.

Even if you accept that the future is uncertain, it is still worthwhile to assess the prospects for the project leader and his team. Not only should the task leader and his team have some idea as to what will happen to them when the current task comes to an end, they need to be able to look with some assurance to that immediate future, if their commitment to the current task is not to be adversely affected.

Discussion Question 11.3: Do you know of any forecasting and/or prediction techniques that are used in your company ? Post your answers on the Discussion Board.

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The Significance of Quality

Which would you identify with the word *quality* ?



Rolls Royce



Honda

The maintenance of high standards in relation to quality is seen to be essential to success. This has been found to be cost effective, and the supreme exponent of the art has been Japanese industry.

How do they do it? This achievement is made through a corporate wide commitment to producing quality products, and involvement, enthusiasm and pride in their work. The techniques employed are well documented in publications by the quality "Gurus", such as *Ishikawa, Juran and Crosby*, and are all based on three fundamental principles:

- Quality is what the customer perceives. It is also a moving target and quality improvement must be a continuous and never ending process.
- Quality is as important in the service industries as in the manufacturing industries. Just one error in an invoice has been found to create more ill will than the need to return three or four items because of faults.
- There is no question of a trade-off between quality and cost. They are a sum, not a *difference*; they are partners not adversaries. Good quality implies a sound and economic use of resources. That quality is expensive, is a myth.



Dr. Kaoru Ishikawa (simple tools, QCC, company -wide quality)	Dr. Joseph M. Juran (quality trilogy)	Dr. Philip Crosby (zero defects and cost of quality)
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Activity 11.1: It would be a good idea to research the work of the Gurus (Ishikawa, Juran and Crosby.)

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Paying for Quality

Customers actually look for Quality.

An independent survey by the American Society for Quality Control confirmed that customers are willing to pay more, far more, for quality than is normally anticipated by the manufacturers or even the quality experts. The premium that would be paid actually varied greatly with product. The premium that customers were willing to pay is expressed as a percentage over the original price.

	Premium	Customer NOT willing to pay premium
Quality cars	33%	10%
Better quality dishwasher	50%	4%
Better TV sets	65%	6%
Better quality sofa	75%	4%
High quality shoes	140%	3%

It seems that, generally speaking, ever fewer people were unwilling to pay a premium, as the size of the premium people were prepared to pay increased.

The survey also disclosed that people in the higher income brackets were by far the most dissatisfied with the quality of American products. They were prepared and able to pay for the higher quality, but couldn't find it on the market.

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An Attitude of Mind

Quality and Productivity must go hand in hand.

It is of no use producing a superb quality product unless it can also be produced in a reasonable time at a competitive price. This demands high productivity.

The relationship between that should exist between quality and productivity is determined by one common factor: People. Although techniques have been discussed on how to achieve quality.



Quality itself is not a technique.

Quality is about care, people, passion, consistency and commitment.

Quality also comes from people working together in a team with a common purpose. It has to be an obsession: it must form a 100% objective whilst at work: even 99% is just not good enough.

Quality is an attitude of mind.

There is no doubt that if quality and productivity go hand in hand, the end result will be a profit. Both quality and productivity are difficult to measure in absolute terms the only ultimate measure of their effectiveness is the fact that the company makes a good profit.

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IBM's Quality Programme



These are a few examples of how IBM achieved significant improvement in quality. The underlying theme throughout is people.

- **Error free installations:** Through proper focusing on this issue, putting a project team on the problem 'in relation to new products, IBM have achieved what was hitherto thought to be impossible an error free installation.
- **Innovation has no limit:** Even with mature products, such as flat ribbon cables, there was a lot of reworking. Inspired by an engineer, a team was set up specifically to attach this problem. The result: reworking fell from 25% to a mere 4% and problems on final testing from 12% to 1.2%, with payback within months.
- **The quest for improvement** was not restricted to their technical products the most impressive results were obtained with their accountancy procedures and they reduced their 2% error rate on data entry to 0.4% over a two year period.
- **Software coding defects:** The number of defects for 1000 lines of code was reduced over a 6 year period by two thirds.
- **Suppliers language:** When discussing quality with both customers and suppliers, IBM found that they needed to translate issues and measures of quality into the language of the partner to ensure that quality levels were both specified, achieved and maintained.

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Research and Development

Research and development, is very difficult to assess in terms of quality and productivity. Their profitability can never be assessed yet their efficiency can be measured.



Research undertaken by Massachusetts Institute of Technology (MIT), found that in order for a research and development team to be efficient, it was essential that 4 criteria are met.

- **Synchronization of team and organization** - ensure that the long term goals of the team were in line with those of the organization.
- **Commitment of organization to team** - to provide a secure working environment for the innovative team, as already discussed.
- **No turn over of project management** - as the project leader is crucial to the success of the R&D or innovative project.
- **Effective interfaces between team members and rest of organization** - to ensure that the team members retain contact with the reality of the current business and its drivers.

Discussion Question 11.4: Do you know of any research projects that have been undertaken collaboratively on an international basis ? Post your answers on the Discussion Board.

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Use of Incentives

Human nature is very complex, and it is difficult to determine exactly what it is that motivates individuals and ensures higher quality, better productivity and innovation.

Financial incentives are a considerable help but unfortunately, financial incentives can often become counter-productive, as incentives for individuals are not the same as incentives for teams.

Incentives such as a pro-rata bonus scheme, will certainly encourage people to take



on more work, and the ambitious will stand out above the others, but this is not necessarily a good thing. Of more importance is the team, and its concerted effort: incentives should never be so designed as to destroy the team concept - since that is crucial to success.

A company profit sharing scheme can be effective, but it is also important to note that there is an immediacy aspect required to the reward of outstanding work, and there is often a delay in the pay-out of such schemes.

When comparisons between the United States and Japan are made, the Japanese system works by making a significantly higher number of lower rewards than the American counterparts.



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Maintaining and Improving Quality

The primary principle that is employed by organizations who are committed to maintaining and improving quality is that of the **Quality Circle**. The quality circle is, in effect, a very special type of team, developed for this specific purpose.

Unlike the normal project team which is usually involved in a wide range of subjects, the quality circle is involved with one subject only. It usually consists of 8 to 10 members, with appropriate skills, and is concerned with making specific recommendations for the improvement of an existing operation, service or product.



The team has to use all the available facts, even if they are inadequate and then seek more facts if that is felt to be necessary. The team is often involved in brainstorming, so brainstorming techniques can also help.

Disagreement can lead either to hard feelings or to innovation, depending largely on the sense of purpose which drives the team. The clash of ideas however, should be encouraged but the clash of personalities discouraged.

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The Need for Involvement

Imagine what would happen, if a leader responds to a suggestion with "it is contrary to company policy" or "it just won't work". It is highly unlikely that the suggestion will be further worked on, and the morale and motivation of the individual making the suggestion will drop.

Everyone needs to be involved in innovation, and encouraged to provide good ideas that will be given due consideration.

This is the way of life in Japan.

Japan has created the proper climate for innovation, by insisting that everyone, right down to the worker on the shop floor, is involved in innovation. Their ideas are requested and acted upon. Further the office personnel, suppliers, salesmen and subcontractors are all treated as members of the larger team and asked to contribute their ideas. This co-operation has become all the more important with increasing computerization and the interrelationship of all the operations.

Some constructive ways of encouraging involvement in a meeting situation:

- ask open ended questions
- use silence when appropriate
- redirect questions to other team members
- avoid win / lose situations
- make eye contact
- use humour when appropriate
- be willing to listen



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Performance Follows Commitment

How does one increase performance?



It is apparent that performance is wholly dependent upon employee attitude, and the key attitude is that of commitment.

For an employee to be committed, they need to have a cause to which all can subscribe. If the causes are believable and believed, then the employees will maintain their commitment to the company, the team and its products. Management cannot order commitment, but it can get people involved by translating the overall company cause into specific actions relating to small groups, and then see it spread.

Phrases such as "more profit" or "continued growth" are meaningless to the average employee such objectives need to be broken down and set before the team members in terms that are meaningful in the context in their day to day activities.

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You Get What You Expect !

Positive	Negative
<ul style="list-style-type: none">Expectations bring positive results	<ul style="list-style-type: none">Expectations bring negative results

When we consider people's involvement and commitment to their work, there is a very simple adage which should never be forgotten. "A person performs as you expect the person to perform, or to put it the way it really happens, a person does what you expect of him, rarely more than you expect of him. It is a very simple truth and is often forgotten."

This is known as the "Pygmalion effect", named after a certain king of Cyprus.

Mythology tells us that the king sculpted a statue of a woman that embodied all his own desires and expectations.

His repeated overtures to the gods finally resulted in life being breathed into his statue.



George Bernard Shaw also took up this theme in his play Pygmalion, where a professor transforms a cockney flower girl into an aristocratic woman.

It has further been asserted that student performance is far more in accord with the teacher's expectations than with their own natural ability.

This also applies to managers and their employees those managers who expect and look for the best from their employees will get it.

Discussion Question 11.5: Have you had any experiences with this effect and what impact has it had on your own career and working environment ? Post your answers on the Discussion Board.

The significance of all this is that it demonstrates the belief that expectation plays a most significant role when you are dealing with people. Expectation, therefore must have a powerful influence on all the three aspects we are dealing with here, namely quality, productivity and innovation.

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Enthusiasm is the Key

The link between expectation and a winning formula for performance is that employers with high expectations of their employees are able to find a cause about which the employees are able to enthuse.

There seems to be no limit to what can be achieved once the cause is there and has been successfully communicated to all the team. The most obvious example of

this is the winning formula one racing team.



Discussion Question 11.6: Can you think of other examples from local industry or globally ? Post your answers on the Discussion Board.

There is no doubt that having a cause is a very powerful motivating factor, but to be meaningful it has to be translated into terms that all can understand. This is the challenge facing today's managers and leaders. For a cause to inspire people, so that they are committed, management needs to communicate that cause effectively. And we must not forget that a new cause is necessary when the present cause has served its purpose.

We live in a fast - changing and dynamic world: *people like change and something new.*

It becomes the task of managers to devise that for them.

Discussion Question 11.7: Are you aware of what type of causes, could inspire the required level of commitment and enthusiasm within your own industry and/or company/or team ? Post your answers on the Discussion Board.

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Resources

Interpersonal Skills Goal Directed Behaviour at Work , by John Hayes, ISBN 0 04 445 550 3

Bernard Shaw - <http://www.bartleby.com/people/Shaw-Geo.html>

Bernard Shaw - Man and Superman - <http://www.bartleby.com/157/>

Bernard Shaw - Bio - <http://www.nobel.se/literature/laureates/1925/shaw-bio.html>

TQM Guru's Ideas - <http://www.hkbu.edu.hk/~samho/tqm/tqmex/gurus.htm>

Links

[Project Management Glossary](#)

Lesson 12 - Mentoring and Coaching

Mentoring and Coaching - An Introduction | Mentor - A Definition | Mentors in History | Mentoring | Mentoring Relationships | Benefits | Downsides | What do Mentors do ? | Critical Success Factors | Monitoring | Mentors |

Mentoring and Coaching - Setting the Foundations | Mentoring versus Coaching | Needs and Resources | Uniqueness | Self-Development | Understanding Mentoree's Needs | Emotions and Feelings | Managing Change | Moving Forward |

Mentoring and Coaching - Behaviour | When Does Mentoring End ? | Listening | Listening Styles | Listening Selectively | Speech Rates | Active Listening | Listening Preparation | Attending | Misunderstanding | Prompts | Accents | Questions | Concentration | Reflecting | Touch | Furniture | Spatial Behaviour | Appearance | Believability | Johari Window | " I " Messages | Force Field | Criticism | Advice | Drama Triangle | Basic Transactional Analysis - Ego States | Managing Relationships More Effectively |

Mentoring and Coaching - Gains and Difficulties | Partnership | Expectations | Mentoring Agreements | Special Mentoring Situations | Most Useful Skill | Specialist Areas |

Mentoring and Coaching - An Introduction

This lesson introduces the topic of mentoring, its history and some key concepts.

During the lesson there are several exercises for you will undertake.

There are no right or wrong answers for any of these exercises the important aspect of them is to begin a process of self-awareness as to how you may have experienced and benefited from mentoring (possibly sub-consciously) in the past.



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Mentor - A Definition



The story of Mentor comes from Homer's Odyssey. When Odysseus, King of Ithaca, went to fight in the Trojan War, he entrusted the care of his household to Mentor, who served as teacher and overseer of Odysseus's son Telemachus.

After the war, Odysseus was condemned to wander vainly for 10 years in his attempt to return home. In time, Telemachus, now grown, went in search of his father.



Telemachus was accompanied on his quest by Athena, Goddess of War and patroness of the arts and industry, who assumed the form of Mentor. Eventually, father and son were reunited and together they cast down would-be usurpers of Odysseus's throne and of Telemachus's birthright.

In time, the word **Mentor** became synonymous with trusted adviser, friend, teacher and wise person.

History and legend record the deeds of princes and kings, but each of us has a birthright to be all that we can be. Mentors are those special people in our lives who, through their deeds and work, help us to move towards fulfilling that potential.

A new form of mentoring is evolving that better suits the lean, high tech, globally competitive firms that are emerging in our society.

The concept of mentoring is no longer tailored to the vertical hierarchical organisation. That old environment was paternalistic and nurtured the status quo.

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Mentors in History

History offers many examples of helpful mentoring relationships such as:



Mentoree in red and Mentor in blue

Discussion Question 12.1: Are you aware of any other famous mentoring relationships ? Post your answers on the Discussion Board.

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Mentoring

Mentoring is:

- a process whereby two people work together to discover and develop the mentoree's latent abilities;
- empowerment of the mentoree by developing his or her abilities;
- developing the mentoree for the responsibilities they will assume during their lifetime (work/career);
- influential people helping the mentoree reach their goals;
- counselling, teaching, work relationships, etc.;
- a work oriented arranged marriage;
- a shared adventure.

Have you ever been mentored?

Mentoring Exercise 1 - You as Mentoree

In all our lives, there have been moments when someone provided an 'Aha!' experience which allowed us to pierce the core meaning of some event, in someone, something, or ourselves. Write about one of your own such experiences.



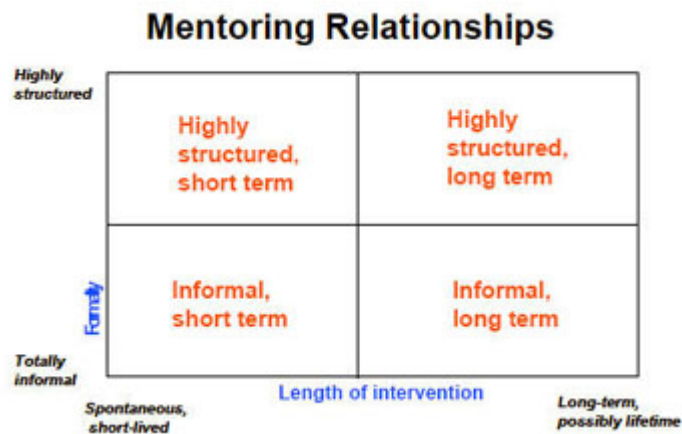
Who provided you with a saying that had great meaning for you, that influenced your thinking or behaviour, and that you sometimes repeat? Write down one such saying or quotation and where it came from.

Who helped you to uncover an aspect, an ability or a talent of yours that until then had lain dormant? Describe one such incident.

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Mentoring Relationships

Mentoring can be done by anyone, at any time and in almost any place. Mentoring can be a one-off intervention or a lifelong relationship. It can be carried out informally, as part of a friendship, or formally, as part of a highly structured new employee training program. Many people who have been mentored recognize that something special has happened, but they may not even have known what to call the experience.



- **Highly structured, short term** - the relationship is formally established for an introductory or short period often to meet specific organizational objectives.
- **Highly structured, long term** - often used for succession planning, this relationship involves grooming someone to take over a departing person's job or function or to master a craft.
- **Informal, short term** - this type of spontaneous mentoring ranges from one-shot help to occasional or as-needed counselling. There may be no on-going relationship.
- **Informal, long term** - friendship mentoring consists of being available as needed.

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Mentoring Benefits

A set of potential benefits of the appropriate use of mentoring:

- increased productivity
- better assessments
- management / technical skills improved
- latent talent discovered
- leadership qualities refined
- performance improvement
- prevents 'rust'
- better staff retention

Many of these are qualitative benefits, difficult to quantify but they all have the potential to lead to the improved staff morale and lower staff turnover which lead to a more effective organisation through better teamwork and increased productivity.

People Need to be Mentors !

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Mentoring Downsides

Beware, however of the dangers and pitfalls, if mentoring inappropriately applied.

- favouritism
- career climbing
- internal politics
- role misunderstanding
- jealousy
- perceived threat (Queen Bee effect)
- elitism

Mentors have been seen as senior people in an organisation who took talented young people under their wing and protected, taught and even sponsored these proteges. However, in recent years this sponsoring role has been criticised for leading to favouritism,

career climbing and internal politics.

In today's globally competitive organisations some people may dislike the word protégé because of the overtone of patronage.



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What do Mentors do ?

Mentoring Exercise 2 - Things Mentors Do

Complete the following by placing a check mark next to the items you or your mentor have done:

Things mentors do:	Others have done this for me	I've done this for others
Set high expectations of performance Offer challenging ideas Help to build self-confidence Encourage professional behaviour Offer friendship Confront negative behaviour/attitudes Listen to personal problems Teach by example Provide growth experiences Offer meaningful sayings or quotations Explain how the organisation works Coach Stand by people in critical situations Offer wise counsel Encourage winning behaviour Trigger self-awareness Inspire Share critical knowledge to their possible disadvantage Offer encouragement Assist with career growth		

Mentoring Exercise 3 - Life Experiences



Who arranged an unusual learning experience for you that allowed you to see into another sphere of life or to look behind the scenes? Describe one such episode.

Describe the most unusual mentoring experience you have encountered, and indicate its importance to you.

Identify one situation where you could have, or did provide, an unusual experience for another person, which would open new horizons for them, enable them to see how other people live or help them to see something important in a new light.

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Mentoring Critical Success Factors

Even formal mentoring is largely the art of making the most of a given situation.

This flexible view tends to distress some individuals, who expect and perhaps need a cookbook approach to any task - they want to know exactly what they are supposed to do, how to do it and when.

- mutual choice
- relationship extends beyond professional interest
- no threat
- mutual need

Mentoring is more than doing a good job - it is help that goes beyond obligatory relationships.

- affection
- trust

Teachers and lawyers can mentor ...

- What is the difference between a good teacher and a great teacher?
- Or a good lawyer and a great lawyer?

Mentoring involves going above and beyond. It is a relationship in which a person with greater experience, expertise and wisdom counsels, teaches, guides and helps another person to develop both personally and professionally.

Mentoring Exercise 4 - Life Helpers

Identify three people who have helped you under the categories below. Describe what they have contributed to your life.

- Someone who has inspired you to shift the direction of your life in a constructive way.
- Someone who has provided something to help you grow in depth of feeling, character, or moral or ethical integrity, or who has helped you to develop a deeper commitment to your values.
- Someone who has provided some form of help to you at just the right time.
- Were any of these a spontaneous response to a great need of yours whether you had recognised the need at the time or not? If so, which?

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Mentor Monitoring



As with any new responsibility, it is important as well, that the mentors are given the support and feedback to enable them to fulfill their roles to the best of their ability.

This can be undertaken via a variety of mechanisms, such as, shadowing, supervision, peer counselling and/or mentor groups; at least one of which should be employed.

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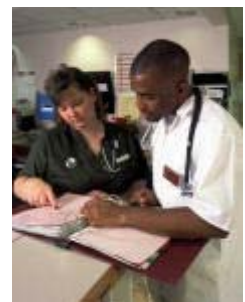
Mentors

Mentors are helpers. Their styles may range from that of a persistent encourager who helps us to build our self confidence, to that of a stern taskmaster who teaches us to appreciate excellence in performance. Whatever their style, they care about us and what we are trying to do.

Mentoring as a developmental art was going on long before the Greek classics gave it a name. In fact, it is probably one of the oldest forms of human development. Mentors job was not merely to raise Telemachus, but to develop him for the responsibilities he was to assume in his lifetime. Mentors still pursue similar tasks.

We cannot separate our career aspirations from other aspects of our development as human beings, citizens and members of our employing organisation. To gain from mentoring, a person has to reach out, grasp and draw into himself or herself the lessons that mentors offer. The mentoree can only experience the beneficial gifts of mentoring by assuming ownership of what the mentor has offered.

Encouragement through coaching is what is needed not enforcement of rules and regulations as if in a police state, as this would more likely lead to rebellion and mistrust.



Mentoring Exercise 5 - Outreach

Relate on experience where you reached out to another person who was deeply in need, and your help

appeared to make a beneficial difference to that person.

Describe one experience you observed, read, or heard about where someone reached out to another person to help in an unusual way. It should have an imaginative or unusual twist to it, which helped to make the experience memorable.

Describe one mentoring experience you had which did not fit the direct, one to one aspect of mentoring. For example, a speech, a quote from literature, a TV programme, in a conversation you happened to overhear when you were not the person directly being spoken to.

[GOTO TO](#)

Mentoring and Coaching - Setting the Foundations

We will look at the differences between mentoring and coaching, and developing mentoring skills. A significant element of this is the importance of understanding the mentoree's needs.

You will complete various exercises that provide valuable support to the teaming process. They begin with further self-assessment, and will take you through some set scenarios to explore how you might react in a mentoring situation. As before there are no right or wrong answers to these exercises.

[GOTO TO](#)

Mentoring versus Coaching

Mentoring is seen as the process whereby mentor and mentoree work together to discover and develop the mentoree's latent abilities. The goal is not a particular position in the company - rather it is empowerment of the mentoree by developing his/her abilities.



A coach on the other hand drives the pupil to attain the highest possible goals, and strives to attain those goals to the exclusion of all other things.

[GOTO TO](#)

Needs and Resources

Mentoring can range from a spur-of-the-moment intervention to an intense long-term relationship.

We need to assess where we are at the moment recognising that conditions and our interests may need to be re-appraised from time to time.

Needs and Resources

Mentoree need	High	Reallocate to different mentor?	Intense Productive
	Low	Low Spontaneous Occasional	Multi-mentoree?
		Low	High
		Mentor resources	

The **needs of the mentoree** and the **resources of the mentor** can vary over time, reflecting the complexities of life.

The mentor's and mentoree's willingness, readiness and appropriateness need to be judged according to the individual situation. A very willing mentor trying to work with a mentoree who perceives little need for help can be

inappropriate. Similarly, a needy mentoree and overloaded mentor may not work well together.

Mentoring Exercise 6 - Needs and Resources

Mentors bring a variety of resources to a mentoring event or situation. These may vary according to our job, our personality, our interests, our experiences, our network of friends and associates, and our available time and energy. Identify some of the special assets that **you** bring to a mentoring situation. There may be one or more in each category.

My position or work experience:

Things I like to do:

My education, training and/or wider experience:

My pastimes, hobbies or other interests:

My special skills and knowledge:

Things I feel passionately about:

Other personal assets:

GOTO TO

Sitting Next to Nellie ... Not !

Sound mentoring respects the uniqueness of the mentoree and strives to enhance the special strengths of that person. Effective mentors tend to focus on what the mentoree did in response to the mentor's help, rather than how he/she did it.



The desire to **do it my way** is critical to the mentoree's sense of self, for it respects that person's individuality. Doing something the mentor's way may lessen mentoree involvement. It may be a way for the mentoree to avoid thought or responsibility. It may also be downright uncomfortable for the mentoree. The mentoree should adapt the mentor's help to his/her own situation and style. This enables the mentoree to wrestle with the details, perhaps try different approaches, and discover their own talents or strengths.

A mentor must not be tempted to take over a task and **do it for them** - it is important that the mentor lets go, and employs skills that do not inflict too much prescription or direction on the mentoree.

Do not be tempted to take the *fairy godmother* role, and create a clone of yourself - in doing this, you only succeed in passing on your bad habits as well as your good ones!

Mentoring Exercise 7 - Non-Directive Mentoring

Identify three situations where you have served or could serve as an effective role model.

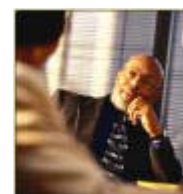
Identify two positive attitudes you display, and two ways you help others to overcome negative feelings about themselves.

- Positive attitudes:
- Overcoming negative feelings:

How comfortable do you feel just listening to people with problems?

What is your natural listening style?

How good are you at sharing ideas and information in a neutral context?



Mentor Self-Development

Some of the best mentors are people who assume that they, as well as their mentorees, are in a lifelong process of self-development. We need, therefore to decide what types of mentoring we might practise most successfully and what knowledge and skills we need to develop to stay up to date.



Focus on basic principles and fundamental truths - this may not be a static activity. The application of fundamental truths to new challenges requires constant re-assessment, discussion and even argument until new wisdom is forged. High Court justices, ecclesiastics and good supervisors do this.

Keep abreast of new developments and their implications. This is a more dynamic source of mentoring. It means that a mentor's task of self-development, learning and mastery is never finished. This need not be a heavy task if we choose specialities such as the evolving mission of our organisation or the technology of our given field.



Mentoring itself is an evolving field. If, as a mentor, you choose to master active listening, coaching skills, effective confrontation techniques or new methods of resolving conflict, you are starting a journey of self-development.

Mentoring Exercise 8 - *Mentoring Styles*

Do you like to philosophise, discuss and argue interesting points?

- What would your response be to this type of mentoring?

Do you like to be active, interested in what works, and get things moving?

- What would your response be to this type of mentoring?

Do you like to discuss issues around a concrete objective?

- What would your response be to this type of mentoring?

Do you like to research and discuss all the possible approaches to a situation?

- What would your response be to this type of mentoring?

With what type of mentoree would you work most productively?

List three types of self-development you might start to consider in order to become a better equipped all round mentor.

Post your thoughts on the Discussion Board.

Case Study 1 - Jamal

Read the [case study](#) and answer the questions. Post your answers on the Discussion Board and be ready with your answers during the next chat session.

Understanding Mentoree's Needs

Any mentoree has some general needs which he shares with others of similar background and situation. He also has his own personal and unique agenda and his



own values, perceived limitations and aspirations. Complicating this highly personal equation is guidance from his mentor and other opinions, desires and events that intrude upon the mentoree's daily life.

During the mentoring process, the mentoree is given the opportunity to consider changes offered by his/her mentor, whether they are generated by a challenging opportunity or a revealing, personal insight. This reaction to change is crucial, whether it is self-imposed, a new option or imposed.

Recognizing the needs of a person adapting to change, and responding appropriately, is the mentor's challenge.

[GOTO TO](#)

Emotions and Feelings

Wherever change occurs, there will be a degree of fear, stress or anxiety and it is often part of the mentor's role to simply be there for their mentoree, to listen, to comfort and to be a friend.

Feeling = Emotion + Situation

Mentoring Exercise 9 - Reading Signals

Problem messages from mentorees usually contain a fact and a feeling. "I have got a financial problem I can't do anything about" is a factual statement, but does not indicate the feeling. "My financial situation is driving me crazy" indicates the level of feeling about the situation.

- List three factual statements a mentoree might make to signal that he/she was experiencing a problem.
- List three 'feeling' statements a mentoree might make.

Feelings may also (more usually) be expressed non verbally. List three different non-verbal ways a mentoree might signal different feelings along with the first 'factual' statement you wrote above.

How might you respond to each of these three? List three specific responses you might make that would keep the ball in your mentoree's court without signaling your lack of real interest.

[GOTO TO](#)

Managing Change

When a person is undergoing significant change, they usually need five things to adapt successfully:

- A vision of how they and things around them will be when they have changed successfully.
- Time to absorb the new vision.
- Time to adjust behaviour.
- Coping mechanisms to manage the stress of change.
- Time to ponder the meaning of the change, to internalise and own the change.



Context shifting is the key to this process - if a person can clearly imagine what he and his world would be like if he successfully accomplished the desired change, he will begin to do things which move him towards his goals. This mental adjustment needs to be imagined in positive terms, instead of the dread scenarios we often create in our minds. Helping our mentoree to shift their mental context from today's problems to tomorrow's success can be very productive.

We should not expect instant change. In fact, quick change can be so stressful that pain overwhelms us or encourages backsliding.

Mentoring Exercise 10 - Self Image

Think of one valuable change you would like to make in your own life. Imagine what you and your environment would be like if you accomplished that change. Focus on positives. Describe this condition.

- List the ways in which you bolster your own self image.
- List the coping mechanisms you use to deal with stress in your own life.

Which of these techniques would you be willing to share with your mentoree?

Which would you not wish to share (i.e. negative responses, health threatening, culturally dependant methods)?

[GOTO TO](#)

Moving Forward

Some mentoree adaptations may be noticeable or even dramatic. Others may be gradual and almost imperceptible. Some may be cloaked. If the mentoring relationship is a continuing one, the mentor may need to:

- Pick up on subtle concerns the other person begins to articulate.
- Notice small or gradual changes which seem significant.
- Read verbal and non verbal signals coming from our mentorees.

All this can certainly be overdone, but such signals can be clues and cues that help is needed. They may even help to bring the problem to the surface of the mentoree's awareness or to define an emerging difficulty.

Dealing effectively with small problems to keep them from becoming large ones is a primary way mentors can assist their mentorees.

Listen for the use of absolutes they provide excellent clues, such as

- "I never seem to get along with my bosses" or
- "He gets to me every time we have a conversation".

Mentoring Exercise 11 - *Recognizing Small Problems*

Identify three signals (verbal or non-verbal) which a mentoree might give, perhaps unconsciously, which could suggest that a mentoree is having job problems.

Identify three repetitive patterns which a mentoree might give which could indicate that a mentoree is having difficulty with just one particular aspect of their work.

Identify three repetitive complaints which a mentoree might make which could suggest an unresolved personal difficulty.

Listen for absolutes they provide excellent clues.

Case Study 2 - Aisha

Read the [case study](#) and answer the questions. Post your answers on the Discussion Board and be ready with your answers during the next chat session.

[GOTO TO](#)

Mentoring and Coaching - Behaviour

We will look at the positive and negative behaviours that may occur in a mentoring situation, and how they might best be handled. We will take another look at listening skills, this will be an ideal opportunity to revise some of the earlier material, in a specific context.

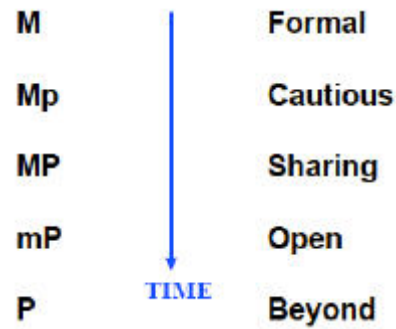
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When Does Mentoring End ?

The initials in the left hand column,

indicate the relationship between the **mentor** and the **pupil** (mentoree).

The capital letter indicating the balance of power in the relationship.



The natural life cycle of a mentoring process is likely to encounter one or more of these phases. How the relationship moves on through these changes is dependant upon the needs of the mentoree each represents an important junction in a persons life, and the mentor must be aware of the involvement required and when to back off.

Mentoring Exercise 12 - Moving On / Growth Influences

Identify the situations where it might seem appropriate for a mentoree to move on.

Think back to an important decision you had to make in your own life where there were several alternatives, which resulted in a significant change. List the three things that you needed most from those closest to you.

Think back to a point where you made, or could have made, a serious mistake or error in judgement. What three things did/could someone else do/have done that would have prevented the situation from turning out badly?

What role was the person in at that time? Would the same person have been in other situations?

[GOTO TO](#)

Listening - A Core Competence for Life

As discussed earlier - listening is one of the key core competencies - not only for the competent information systems professional, for everyone throughout their life.

Providing a listening ear, without taking on the other person's problem, giving advice or joining them in the *isn't it awful* game can serve as a powerful aid to a mentoree. Many mentors believe that respectful listening is the premier mentoring art.



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Listening Styles

Can you remember the four main styles of listening?

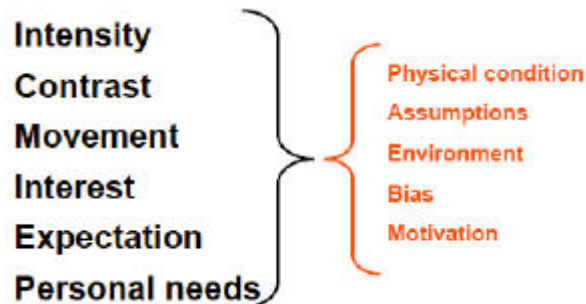
- **Comprehension listening** is the kind of listening that people engage in when conducting fact finding interviews or attending lectures. It involves listening to facts, ideas and themes that may be of future use.
- **Evaluative listening** is the kind of listening people engage in when trying to make judgements concerning the persuasive messages of others, such as sales persons and negotiators.
- **Empathic listening** is the kind of listening people engage in during counselling sessions, appraisal interviews and more generally when faced with someone who has a need to talk and be understood by another person. It involves the listener demonstrating a keenness to attend to and understand the thoughts, beliefs and feelings of the speaker.
- **Appreciative listening** is the kind of listening people engage in for pleasure. It might occur when listening to music, poetry or children playing. It involves the listener seeking out signals or messages that she wants to hear.

[GOTO TO](#)

Listening Selectively

There are many competing demands for a listener's attention. An interviewer might be more interested in how the candidate is dressed - a mark on his tie, or the aura of tobacco smoke that surrounds him.

A colleague's loud voice might be a distraction, or the interviewer might only notice a hydraulic drill when it is switched off, or attention might be drawn if a person changes from a relaxed posture to bolt upright.



Background and culture might influence the meaning attributed to certain behaviours being aware of one's own personal filters can help a person listen more effectively. An interviewer should prepare a check list to help make sure that attention is paid to all the relevant messages, and that the effects of selectivity are minimised.

The message itself can influence how much is received. If it is bad news, or the listener does not want to know, then the tendency is often to *switch off* the listening process.

Auditory noise is only one of many environmental problems, the listener's attention might be drawn by an interesting poster, or an attractive view from a window.

[GOTO TO](#)

Speech Rates

The speech rate can significantly affect the listening ability of others.

Normal speech is said to be around 140 words per minute - but it has been claimed that listeners prefer to listen and can comprehend better, and are more likely to believe the message that is presented at **190 words or more per minute**.



Listening can be possible up to around 280 words per minute - but much higher than this concentration begins to deteriorate. Although people can think at a rate considerably faster than this, they require a reasonable differential between speaking and thinking rates to process what they have heard.

Slower rates - below 125 words per minute can impair effective listening, just as much as excessively fast rates. The listener's capacity to process information is under-utilised, so attention begins to drift.

[GOTO TO](#)

Active Listening

Attending - physically and psychologically.

Listening - receiving and understanding - verbal and non verbal.

Empathy - within the speaker's frame of reference.

Probing - more concrete and specific.

[GOTO TO](#)

Listening Preparation

The kind of preparation that the listener can engage in involves:

- Arranging important listening tasks for a time when he/she is least likely to be stressed or fatigued.
- Increasing his/her receptivity by making a conscious effort to put aside temporarily

preoccupying concerns, such as a recent row with the boss or the need to book a holiday flight as quickly as possible.

- Arranging an environment that contains as few distractions as possible, thereby encouraging all parties to concentrate on communicating.
- Reviewing background material such as notes and reports or issues to be discussed. This kind of preparation can stimulate interest and help create the right mental attitude.



[GOTO TO](#)

Attending

Squarely
Open
Lean
Eye contact
Relaxed

Remember the SOLER mnemonic:

- Face speaker **S**quarely.
- Adopt **O**pen posture.
- **L**ean upper part of body towards speaker.
- Maintain good **E**ye contact.
- Try to be **R**elaxed.



[GOTO TO](#)

Misunderstandings

Resolving misunderstandings, can be a very painful and difficult experience - if you believe that a misunderstanding has taken place - try and resolve it as soon as possible.

[GOTO TO](#)

Prompts

The listener can encourage the speaker to talk, can better concentrate on the task of listening and can gently seek out more information to help promote a better understanding of the speaker's message by using door openers, minimal prompting, accents, statements, questions, attentive silences and a number of special concentration techniques.

Minimal Prompts

A door opener might be a description of body language:

- "You are not looking yourself today" or "you sound a bit low"

A minimal prompt might be:

- "mmmm" , "really ?" or "tell me more"

An accent is a restatement of one or two words and might be:

- Manager: "The report seems OK"
- Colleague: "Seemed OK ?"
- Manager "Well, what I expected was"

Infrequent questions; generally we ask too many questions - it is often only necessary to ask questions when we believe that the speaker has more to say, but does not know how to say it.

- "Could you say a little more about why negotiations broke down?"

mmm...

Yes ...

Right !

Really !

And ? ...

Wow !

And then ? ...

[GOTO TO](#)

Accent

Say "how are you " three times,
each time with the accent on a different word.

How are you ?

How **are** you ?

How is the meaning of the question altered
with the accent in each place?

How are **you** ?

Questions or Statements

If the listener asks too many questions the speaker might end up feeling that he is being grilled. An alternative to some questions might be the kind of statement that makes a demand on the speaker to say more, to elaborate or clarify.

For example, the statement: *"What you have been saying seems to have made you very angry"* might encourage the speaker to talk about his feelings of anger with out feeling that he is being quizzed.

Concentration / Receptivity

The listener can improve his/her ability to follow what the speaker is saying by using one of a number of techniques that aid concentration. The listener concentrates on what the speaker is saying and heightens his/he receptivity by asking him/herself questions such as:

- Why am I being told this now ?
- Am I paying attention ?
- Am I focusing on the key words ?
- What is this person really saying to me ?



Reflecting

Reflective listening is the skill of mirroring back to a person, in your own words and manner, what someone is saying to you. This can be either through paraphrasing a message, reflecting feelings if there is a high emotional content to the message, or try to pick out hidden meanings if a speaker is having difficulty with an issue. It allows speakers to hear what they are saying, see what they are meaning and feel what is happening and through this process, come to a better understanding of themselves and their situation.

Paraphrasing what the other has said also goes a long way towards preventing misunderstandings we often think or feel that we understand what a person has said but this is just guesswork, unless we check our understanding out with the speaker.

In summary:

- Reflect the content of the message.
- Be short and to the point.
- Reflect only the essentials of the message.



[GOTO TO](#)

Touch

Bodily contact and touching behaviour is the most basic way in which people can express such interpersonal attitudes as aggression and affiliation.

Children pat, slap, tickle, pinch, stroke, kiss, hold, kick and punch much more than adults do. Maturity tends to bring with it a considerable reduction in touching behaviour, many of the functions normally served by such behaviours being fulfilled by facial and gestural expressions.

Nonetheless, adults touch others to offer encouragement, express tenderness and show emotional support.

They also touch others, but in different ways (slapping, punching, kicking) to express aggressive interpersonal relationships.



It is possible to plot touch behaviour along an intimacy continuum, ranging from touch and release (pat) being the least intimate, through touch and hold, to touch and stroke - the most intimate.

[GOTO TO](#)

Furniture

It has long been recognised that the shape of a table in a meeting room, the layout of chairs in a lecture room and the arrangement of furniture in a sitting room can have an important effect on the flow of communication. For example, people sitting along the same side of a long boardroom table may experience problems in communicating with each other because eye contact apart from that with immediate neighbours is difficult.



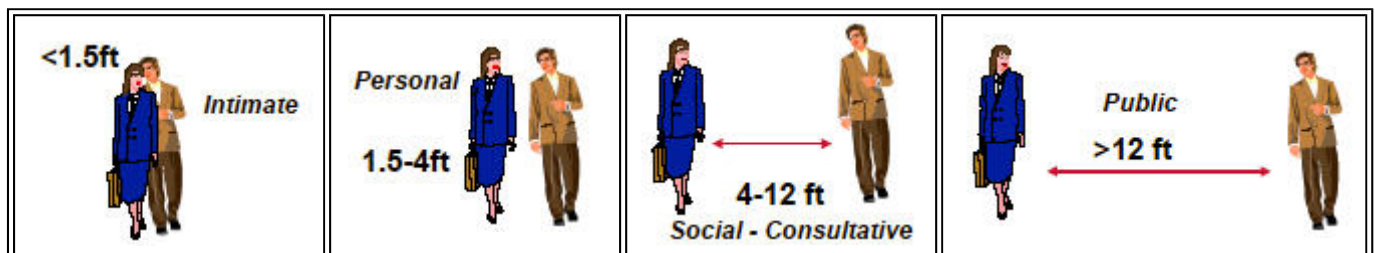
Furniture can be used to key the climate for an interaction. Sitting behind a desk with your back to a window so that a visitor can only see a silhouette of your face deprives the other person of the opportunity to observe your facial expression.

Experiments suggest that the silhouetted person is likely to be perceived as being more dominant, especially if the visitor is seated in a lower chair.

[GOTO TO](#)

Spatial Behaviour

The distance between people when they are communicating, signals something about the nature of their relationship. Four proximity zones have been suggested for different kinds of relationship as shown on the visual.



In the UK, friends or colleagues talking about agreeable matters tend to stand about 24 inches apart. Problems sometimes arise when people from different cultures, with different concepts of personal space, engage each other in conversation. One may feel comfortable standing close to the other, whereas the other may experience discomfort because he feels that his personal space has been invaded.

[GOTO TO](#)

Appearance

Height - Weight - Dress - Hair - Body Decoration

"Know first, who you are; and then adorn yourself accordingly."

Epictetus

Appearance can convey messages about one person's attitude towards others. Certain kinds of clothes worn within a certain context might signal a person's sexual availability.

"Never have your best trousers on when you turnout to fight for freedom and truth."

Ibsen

Respect for another might also be communicated through appearance. Arriving at a mentoring session in worn dirty, casual clothes might give your mentoree the impression that they are not highly regarded or respected.

[GOTO TO](#)

Believability

What is the true meaning of the message if a red-faced man bangs the table with a clenched fist and declares that he is not angry?

Research evidence suggests that non-verbal behaviours generally offer the most reliable clues to what a person is really feeling, in spite of his denial that he is angry.

It appears that people are less likely to inhibit or manipulate certain signals. These tend to be those which they are least aware of, believe others pay little attention to or are beyond their control. In decreasing order of believability the following seven elements are proposed:

- **Autonomic signals** - such as perspiration, skin colour and respiratory patterns.
- **Leg and Foot signals** - such as tightening of leg muscles and jerky, aggressive foot actions.
- **Trunk signals** - such as muscular tonus of the whole body affecting posture.
- **Unidentified gesticulations** - such as assertive finger wagging, imploring palm up hand gestures or hand chops.
- **Identified hand gestures** - such as thumbs up.
- **Facial expressions** - such as anger or surprise can be easily faked but look out for the frozen smile hidden underneath!
- **Verbalisations** - people are able to exercise most control over the verbal messages – and therefore they are least reliable guide to true feelings, when contradictory signals are observed.

Least controlled



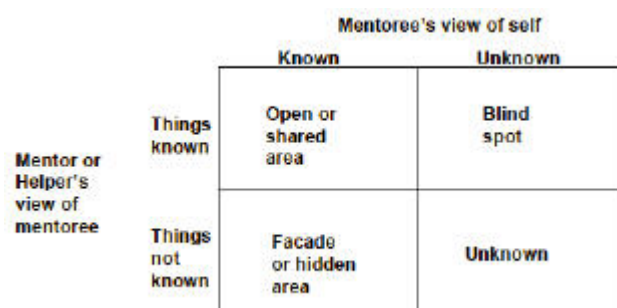
Most controlled

[GOTO TO](#)

The Johari Window

This two dimensional matrix known as the Johari window ...

depicts a need to be aware that your mentoree is only going to make available selected information to you as mentor.



[GOTO TO](#)

" I " Messages

Sometimes a mentor finds it important to confront the attitude, behaviour or plans of his mentoree. To criticise, threaten or pressure the mentoree to adopt another course may lower the mentoree's self esteem. It may be ineffective - the mentoree may retreat with her plans or actions. It may generate resistance or hurt the relationship.

Communication specialists have found that an " I " message confrontation - an authentic message directly from the mentor - is the most effective way to bring about helpful change in the mentoree.

An "I" message generally contains three parts:

- A neutral description of what you perceive the mentoree intends.
- A statement of the possible negative effects on the mentoree or other people.
- The feelings or emotions you are having about the mentorees plan.



An "I" message works because it does not tell the mentoree how to behave.

The mentoree makes the decision.

Mentoring Exercise 13 - "I" Messages

Sometimes it is necessary to confront the attitude, behaviour or plans of the mentoree.

What would be the most likely effects of direct criticism, threatening or pressuring the mentoree to adopt another course?

"I" messages contain three parts:

- a) a neutral description of what you perceive the mentoree intends;
- b) a statement of the possible negative effects on the mentoree or on others;
- c) the feelings or emotions you are having about the mentoree's plan.

"I" messages work because they do not tell the mentoree how to behave the mentoree still makes the decision. However, it is important to ensure sufficient time to listen as the mentoree works through the problem.

Write an appropriate "I" message for the following situations:

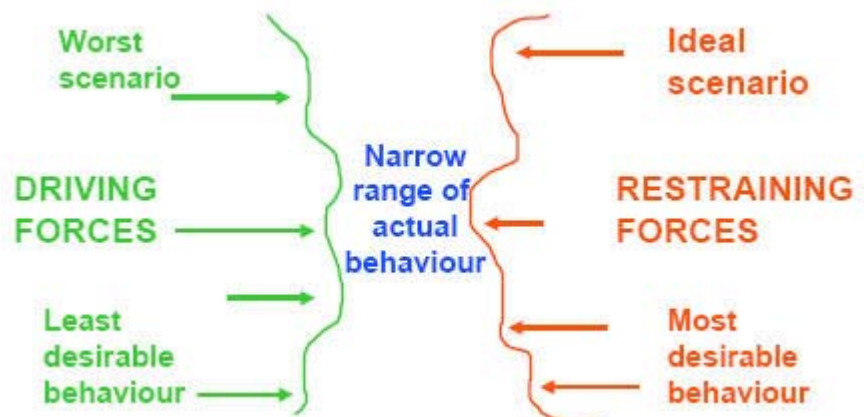
- Your mentoree makes a derogatory remark about a colleague's ethnic, cultural or religious position.
- Your mentoree says that mentoring does not seem to be helping him/her, and wants to drop the relationship.
- Your mentoree is currently working extremely hard, and putting in many hours of overtime; you know that he/she has family obligations as well. He/she wants to apply for immediate promotion, and the new job would need even longer hours.

GOTO TO

The Force Field

In any mentoring relationship there are likely to be driving and restraining forces where conflicts occur.

Careful selection and management of behaviours can influence the long term effectiveness of your mentoring activity.



GOTO TO

Criticism



Most people do not take kindly to criticism - even when it is offered as **constructive criticism**. Criticism is evaluative and judgmental, no matter how we dress it up. When we offer constructive criticism, we want our message to be helpful to the person. But our intentions are undercut by the way that criticism damages self-esteem, generates defensive blocking and drains the energy needed for constructive action.

Also if the person accepts the criticism, he acknowledges that he has been bad or wrong - something he is unlikely to do if he is doing wrong intentionally, and something he should not do if he has not been doing wrong at all.

The key to success is to take new, objective and creative approaches to encouraging beneficial change, rather than to repeat ourselves endlessly and negatively as critics tend to do.

Mentoring Exercise 14 - Constructive Criticism

Do you like, enjoy, or seek criticism? Even when you ask for feedback, is it because you're secretly hoping for some favourable comment?

List five things other people can do to help us change for the better. Consider personal examples such as stopping smoking, getting fit etc. Think about the best vehicle for that help.

What causes you to feel best when you are making progress towards a significant personal goal? List five things that help your progress.

When you try something out and it doesn't work, how do you want the people closest to you to behave? List the five reactions you would most prefer.

[GOTO TO](#)

Advice



Many mentors believe that a large part of their job is giving advice to their mentorees. There is a down-side to giving advice. When we give advice, we assume we have superior knowledge, insight or wisdom related to the problem. This may be true when we are engaged in professional discourse.

Most independent-minded mentorees do not really want advice, though they will value your experience, ideas, knowledge of how things work and special insights into problems. To keep them independent, offer but do not push. They must learn to make their own decisions, if they have not already.

Case Study 3 - Hessa

Read the [case study](#) and answer the questions. Post your answers on the Discussion Board and be ready with your answers during the next chat session.

[GOTO TO](#)

The Drama Triangle



This drama triangle is a way of analysing psychological games, which illustrates why people often resist taking advice.

When a person feels victimized by a problem, he may send a plea for help to a person he perceives as able to rescue him (i.e. as more capable than himself). The victim's feelings of inadequacy are real but his lack of ability usually is not.

The would-be rescuer accepts the inadequacy of the victim and offers advice. In doing so, she contributes the "why don't you - yes, but" psychological game.

Most often the victim rejects the advice with "yes, but", followed by a reason for not taking the advice. This is hardly surprising, since he knows all the facets of his problem and has probably already considered and rejected all the easy answers.

The rescuer has only the information that the victim

gives in response to each suggestion. She keeps making suggestions, each of which is rejected for some new reason. Finally, the rescuer grows impatient with the rejections and turns persecutor. She says something to the effect of "Buzz off - you don't really want to solve this problem".



At that point each party is confined in his or her own judgement. The victim feels even more like a victim. He not only still has the original problem, he also has the would be rescuer exasperated with him. The would be rescuer has confirmed his believe that the victim was and still is inadequate. The victim is also convinced that his problems are too big to be solved by anyone. The relationship has been damaged.

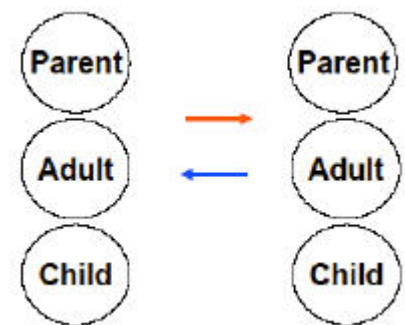
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Basic Transactional Analysis - Ego States

Transactional analysis provides a useful model for understanding the nature of interpersonal relationships. Personality is presented in terms of three ego states: **Parent**, **Adult** and **Child**.

The **parent** ego state comprises a set of feelings, attitudes and behaviours that have been copied from parental figures (nurturing, standard setting, criticising and judging).

The **child** ego state comprises a collection of feelings, attitudes and behaviours that are the remembered reactions to parental behaviour including guilt, anger, rebellion, excitement, joy, sadness and fear.



The **adult** ego state comprises a set of feelings, attitudes and behaviours associated with information processing and objective testing of reality.

The balance of these ego states may vary from person to person, and within the same person from time to time. It is the ego state that predominates that determines behaviour. On one occasion a person may behave as an Adult and on another occasion the same person may behave as a critical parent.

This model can be usefully used to improve a persons awareness of their own personal style. The basic unit of behaviour is referred to as transaction. It involves one person doing or saying something to another and the other responding. By analysing a series of transactions it enables a greater understanding - and therefore possible improvement - of a particular relationship.

[GOTO TO](#)

Managing Relationships More Effectively



An awareness of ones own and others' needs can enable a person to assess what he/she needs to do to make his/her behaviour more effective.

Further interpersonal competence comes from the ability to understand the nature of social interactions, to be able to read behaviour, and to act in ways that will bring about desired outcomes.

[GOTO TO](#)

Mentoring and Coaching - Gains and Difficulties

We will explore some of the mutual gains that can be made from mentoring, and the problems that can arise out of difficult or special situations.

Pressures, stress and the effect of diminishing returns are also covered to ensure that the mentor is able to judge the appropriate action depending upon the state of the mentoree, and their workload.

[GOTO TO](#)

Partnership

Mentoring is often perceived as a one way street, with the mentor giving and the mentoree receiving. In the past, this top-down, parent-to-child relationship was often based on the assumption that the mentoree was not in a position to do much in return except be a dutiful and appreciative protégé.

In the past this often worked, giving career success to the mentoree and a type of parental satisfaction to the mentor. But it tended to produce clones and prepare people to succeed in a world which is now passing. In these days of self-empowerment and rapid organisational and professional change, the senior junior model needs revision.



Today, mentoring may be viewed as a partnership, with both parties freely contributing to the discussion as equals working together, based upon mutual respect. A mentor may still have greater experience, insight and wisdom but the relationship can be one of showing rather than only top-down giving and receiving.

Mentoring is not a bookkeeping exercise. There is no need to balance accounts or to give back in kind. Yet, a two-way flow of kindness, respect or giving can return much to the mentor. In the spaces below, explore ways that giving can flow freely in the relationship.

Mentoring Exercise 15 - Partnership

From the mentor's perspective, list the things you would like to get from a mentoring relationship - be very honest with yourself.

From the mentoree's perspective, list the things a mentoree could contribute to the relationship.

Should these be shared with each other ! Why ? Why Not ?

[GOTO TO](#)

Mentor Expectations

As a cultural value, generosity is extolled. We give for the love and care for our fellow human beings. This giving is usually honest and sincere. But since we also have needs we hope that others will apply the golden rule and that some joy will come our way. If it does not, we may be disappointed and possibly resentful.

Accepting that each of us has needs, and being open and honest about them, can help us to make our expectations explicit. Failing to state our expectations of another person is all too common and unfair. Both mentorees and mentors need to be explicit about what they hope to gain from the relationship.

Mentoree Expectations

The expectations of your mentoree will vary from situation to situation, and from person to person. It is important that you establish what their expectations are at the outset of the mentoring relationship, otherwise you are heading straight for failure.



You could do this by asking the mentoree to write a brief essay of one or two pages describing what he/she expects to gain from the relationship - short term and long term. Ask the mentoree to list any special needs or features of the relationship that should be considered in developing the relationship.

DO NOT ASSUME

FIND OUT FIRST

Mentoring Agreements

When formal mentoring arrangements are established, usually sanctioned by the employer, school or other agency, a mentor mentoree agreement may be helpful.

When both parties in a mentoring relationship have made their expectations clear, reconciliation of views may be necessary. At least they should define how they will work together and what they hope to achieve through this association.

Their agreement may not be formal or even written down it must be remembered that mentoring is a friendly, helping, informal relationship and any effort to extract promises is probably based on fear, mistrust or hostility.

Mentoring Exercise 16 - Mentoring Agreements

What are the key points that a mentoring agreement should contain?

How might these need adjustment after 30 days? After 90 days?

[GOTO TO](#)

Implementing Mentoring

How might you implement a mentoring program in your organization ?

Mentoring Exercise 17 - Action

What factors in your organisation will need to be changed, adjusted, modified, communicated in order for a mentoring scheme to work?

What form of mentoring will be most appropriate? (formal / informal etc.)

Whose responsibility will it be to implement the scheme?

How will the mentor groups be organised?

What will be the best way to implement the scheme?

How will its effectiveness be monitored?

Would a pilot scheme with a defined end date and formal monitoring be appropriate?

[GOTO TO](#)

Special Mentoring Situations

We are now going to look at some of the difficult situations that can arise when different types of people become paired up in mentoring situations.

These represent the three primary challenges in mentoring when it is used to adapt our workforce to demographic changes already under way, to prepare us to operate in a competitive global environment, and to manage organisational and technological change effectively.

Cross-Gender Mentoring

Until recent decades, cross-gender mentoring in organisations has been rare. Several studies of mentoring reveal a number of problems related to cross gender mentoring based on gossip, envy, suspicion, speculation, false assumptions, sexual stereotypes and charges of sexual harassment. Unfortunately, such attitudes and behaviour have lessened the effectiveness of cross-gender mentoring in some environments. Yet each sex has much to offer and teach the other.

Cross-gender mentoring can improve morale, enrich the lives of mentorees and provide valuable insights and experiences to each sex.

A gender-balanced and fairly treated workforce is likely to remain a challenge rather than a reality for some time

Effective cross gender mentoring is one of the tools we can use to achieve this balance and fairness

Mentoring Exercise 18 - Cross-Gender Mentoring

List five advantages to be gained from cross-gender mentoring.

List the main disadvantages.

If you were to mentor someone from the opposite gender, what unique skills might you offer your mentoree?

What unique skills might you learn from your mentoree?

Cross-Cultural Mentoring



Signs of cultural diversity are virtually everywhere and this diversity represents some of the most subtle and special relationships imaginable. Even in a relatively homogeneous society, differences in economic class, religious background, regional allegiance and even family traditions can generate cultural differences which can complicate the task of mentoring.

Cultural differences and our personal response to them are a large part of what makes each of us unique. Our cultural heritage may also enable each of us to appreciate special facets of a problem, approach its solution from different angles and contribute to a more comprehensive solution.

We can trace the origin of a plate of spaghetti to China, modern medicine to the ancient Arabs, the roots of Christianity to the Hebrews of old or modern dance rhythms to Africa. Our lives have gained richness and variety from people all over the world, whether we are aware of it or not. The contributions are almost endlessly varied.

Mentoring Exercise 19 - Cross-Cultural Mentoring

List five advantages to be gained from cross cultural mentoring:

List the main disadvantages.

If you were to mentor someone from a different culture, what unique skills might you offer your mentoree?

What unique skills might you learn from your mentoree?

Cross-Hierarchy Mentoring

Some of the most powerful, effective and long-lasting mentoring can be done by the person who has authority over the mentoree - and this can include parents. The power or authority to reward and punish people creates both opportunities and obstacles to effective mentoring.

The possession of power or authority over a mentoree can work against a helping, caring, nurturing relationship. It is difficult for a mentoree to become her own person when she is subject to pressures from others.



Power and authority, however, need not be used negatively. Used wisely, to challenge, to offer opportunities and to encourage, power and authority can provide powerful assistance to a mentoree.

Mentoring by a supervisor or line-manager must be done carefully, artfully and fairly. In one respect, bringing out the best in each employee may well define the art of supervision. Mentoring can contribute strongly to the development of that art.

Hierarchy is not simply a matter of placing people on an organisational ladder. We have hierarchies of knowledge, of experience, of seniority and yes, of position and power. Hierarchies of influence, personal complexities and abstraction also exist.

Mentoring Exercise 20 - Cross Hierarchy Mentoring

List five advantages to be gained from cross-hierarchy mentoring.

List the main disadvantages.

If you were to mentor someone from a different cross-hierarchy, what unique skills might you offer your mentoree?

What unique skills might you learn from your mentoree?

[GOTO TO](#)

The Most Useful Skill of Them All ... is Knowing our Own Limitations

Knowing our own limitations, and being able to admit that we don't know - or can't do something, is one of the most useful skills that a professional person can have.

It must be remembered that even as a *mentor* - you can't be expected to be able to help your mentoree in difficult situation that he/she might face.

[GOTO TO](#)

Specialist Areas



Knowing a route to solving some of the specific specialist problems that you might be confronted - with is likely to be the best that you can offer in terms of constructive suggestions...

But You Can

After all, listen and provide an unbiased, unprejudiced ear and be available if needed at times of crisis.

[GOTO TO](#)

To summarise, you can make mentoring formal or informal, it's up to you!



It can be a long or a short term investment - a single action or an agreed plan.

The success of your relationship depends upon the commitment you and the mentoree are willing to make to meet the challenges and capitalise on the opportunities.

[GOTO TO](#)

Resources

Interpersonal Skills Goal Directed Behaviour at Work, by John Hayes, ISBN 0 04 445 550 3

Links

[Project Management Glossary](#)



NCC Education
Postgraduate Diploma
in
Strategic Business Information Technology

Module 2
Task Management

Lecturer/Student Notes

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Modification History

Revision	Date	Revision Description
V2.0	September 2004	For issue

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Lecture 24	Mentoring and Coaching (4) – Gains and Difficulties
Lecture 25	Task Management Summary

Suggested Reading List

Mullins L, *Management and Organisational Behaviour*, F T Prentice Hall, 1992, ISBN 0273 651471.

Shea G, *Mentoring: A Guide to the Basics*, Kogan Page, 1992, ISBN 0 7494 0881 2.

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Suzanne de Janasz, Karen O'Dowd, Beth Schneider, *Interpersonal Skills in Organizations*, 2001, McGraw Hill, ISBN 0072441224.

Hayes J, *Interpersonal Skills at Work*, 2002, Routledge, an imprint of Taylor & Frances Books, ISBN 0415227763.

Shepard A, *Hierarchical Task Analysis*, 1998, Taylor & Francis, ISBN 074840838X.

Pegg M, *The Art of Mentoring*, 1999, Management Books 2000, ISBN 1852522720.

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Lecture 2 The Task Envelope – Task Success

Lewis Carroll, *Alice Through the Looking Glass*.

Sarazen, J S, *The Tools of Quality, Quality Progress*, July 1990.

Lecture 5 The Task Envelope – Supporting Disciplines

ISO 9000 – <http://connect.ab.ca/~praxiom/index.htm>

Lecture 6 The Task Envelope – Managing Risk

Hamburg Morgen Post, 28 April 1997, Asahi Shinbun, 7 June, 1997.

Lecture 8 Time Management – Managing Your Time

Alesandrini, *Survive Information Overload*, Pub Irwin 1992, ISBN 1-55623-721-9.

Peter Senge, *The Fifth Discipline*, Random House Business Books; ISBN: 0712656871, 1993.

Lecture 9 Time Management – Managing Meetings

VideoArts Productions, *Meetings, Bloody Meetings and More Bloody Meetings* with John Cleese and Robert Hardy. Further information is available on the VideoArts web site: <http://www.videoarts.co.uk>.

Lecture 11 Principles of Human Communication – Introduction

John Hayes, *Interpersonal Skills – Goal Directed Behaviour at Work*, ISBN 0-04-445-550-3.

Lecture 12 Principles of Human Communication – Listening Skills

Nichols and Stevens, *Are You Listening*, McGraw Hill, 1957.

Drakeford, *The Awesome Power of the Listening Ear*, World Books, 1967.

Lecture 13 Resource Management – Managing Subcontractors

Bingham, Moore and Bruce, 1942.

Hayes J, *Interpersonal Skills*, Harper Collins, 1991, ISBN 0 04 445495 3.

Lecture 17 Principles of Human Behaviour – Leadership

Sir John Harvey Jones, ex-chairman of ICI articulated this in the quote “*Put your people first, above the board of directors, even ahead of the customers and above the world*”.

Maslow, McLelland, Hertzberg, MacGregor.

Lecture 18 Principles of Human Behaviour – The Team

Belbin, <http://www.belbin.com>

Isabel Briggs, *Gifts Differing: Understanding Personality Types*, Myers, ISBN 0-89106-064-2.


Lecture 19 Principles of Human Behaviour – Innovation, Quality and Productivity

Ishikawa, Juran and Crosby, *Project Teams: The Human Factor*.

Lecture 21 Mentoring and Coaching – Introduction

Homer’s Odyssey – <http://www.dusa.dundee.ac.uk/hellenic/odyssey.html>

Introduction to Task Management - 1.1


**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 1
Introduction to Task
Management**

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This session introduces the Task Management Module of the Postgraduate Diploma in Strategic Business Information Technology.

It encourages the students to think about the necessary parameters and skills associated with tasks in an Information System (IS) environment.

We will also look briefly at the structure and content of the entire module, to assist in context setting, as some of the topics may at first glance appear to be incongruent.



Definition

- **Task**

- “a specific piece of work required to be done as a duty or chore”

- **Management**

- “the technique, practice or science of managing or controlling”
- “the skilful or resourceful use of materials, time etc”

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Do the students agree with these definitions?

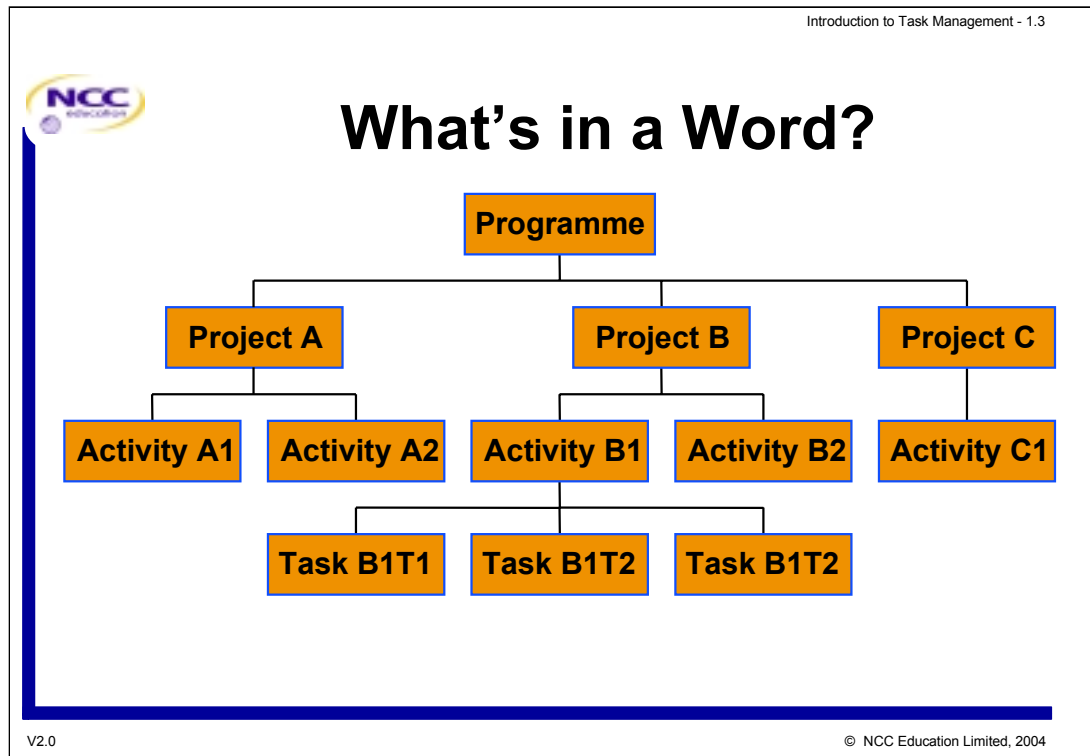
The key words are *specific, work*; and *practice, managing, controlling, skilful, materials, time*.

A task could also be defined as a non-routine, non-repetitive one-off undertaking, with its own specific time and cost targets. This could also be seen as a definition of a *project*, and therefore one could say that *task management* is synonymous with *project management*.

Therefore what is the difference?

Very little really. The difference is only in the scale of the work to be done.

If this session had been entitled ‘Project Management’, then there may have been a tendency to believe that the entire contents of the module were only applicable to those individuals managing recognised projects, whereas in fact every individual in an IS function requires management skills to manage the tasks that they are set.




Just to clarify the terminology hierarchy:

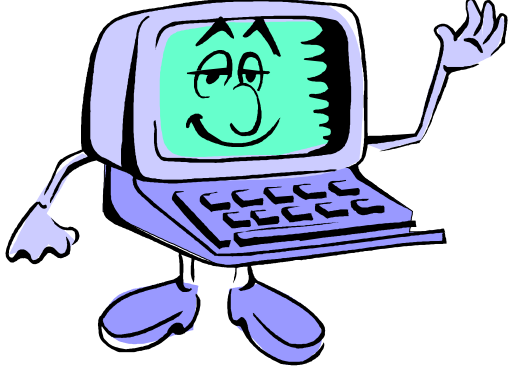
- A programme is usually a selection of projects that are under the control of one individual - a Programme Manager. The main difference between a programme and a project is that a programme rarely has a start and end date. It is populated with projects on a rolling basis, and therefore could continue *ad infinitum*.
- A project however, almost certainly has a start and an end date, usually has a fixed budget, a target product or deliverable and is under the control of a Project Manager.
- Depending on the size of the project there may be multiple levels beneath it, made up of sub-projects and/or activities, each of which is then made up of tasks.

To be responsible for a task is to answer to the Project Manager or his/her representative, and have sole responsibility for a defined component part of the project together with the associated component budget and time constraints, and the requirement to deliver a quality product.

Introduction to Task Management - 1.4

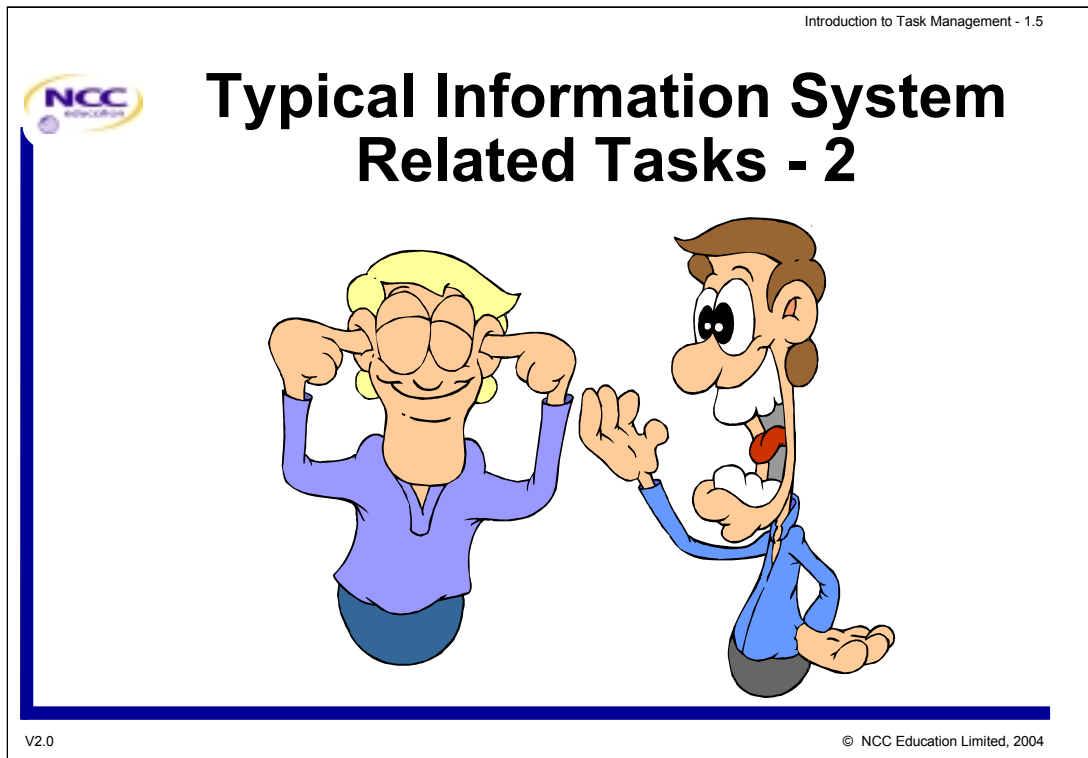


Typical Information System Related Tasks - 1



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- “What are the tasks typically undertaken by individuals in an IS environment?”
- “What are the tasks typically undertaken by individuals who interact with an IS environment?”




So far we have focussed on the technology oriented tasks. Consider now the people oriented tasks such as:

- Communicating.
- Interviewing.
- Team building.
- Presenting.
- Explaining.
- Training.

Introduction to Task Management - 1.6



Who Does What?



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Consider the people oriented tasks identified so far:

- “Who does what?”
- “How do we allocate tasks?”

Relating to some of the tasks already identified, define the characteristics and qualifications of the individual that should be allocated to the task.

- “What should we do if such an individual is not available?”

Introduction to Task Management - 1.7

Skills Needed

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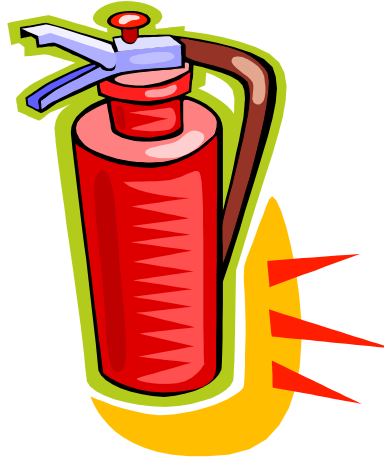
We have identified:

- Creative skills.
- Analysis skills.
- Attention to detail.
- Technical knowledge.
- Careful *building* or combining skills.
- Communication skills.

What other skills can students think of that would be needed to complete an IS team?



Skills Not Needed



Many IS organisations find themselves with insufficient time to develop the new systems that the businesses need, because they are required to maintain a large number of poorly implemented systems that have been installed to meet deadlines, prior to the systems being fully tested.


This often leads to an organisation entering a downward spiral of *fire-fighting* mode, where a constant stream of crisis caused by system failures or problems are the norm, from which it is extremely difficult to emerge.

Several discussion points should arise from this:

- “How would you prevent the need for a fire-fighting mode?”
- “Once in a fire-fighting mode - how would you get out of it?”

It would also be illuminating to discuss whether the majority of managers actually prefer *firefighting* – it’s much more interesting and exciting than doing the planning, after all!!!

Introduction to Task Management - 1.9



Task Management Module Objectives

- **Evaluate requirements and managerial constraints**
- **Apply resource and time management techniques**
- **Integrate appropriate styles of leadership and behaviour**
- **Reconcile human communications with task**
- **Appreciate need for mentoring and coaching**

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To conclude this introductory session, the remaining visuals outline the objectives and topics of the module to set the scene for the subsequent session.

The objectives of the module are to equip the students with the skills to be able to:

- evaluate the requirements and managerial (financial and temporal) constraints within which a task has been specified;
- apply resource and time management techniques to plan and deliver achievable objectives meeting the established requirements within the stated constraints;
- integrate the appropriate styles of leadership and human behaviour into the task management process;
- reconcile the issues and concerns of human communication within task management;
- reflect upon the differing role of mentoring and coaching by evaluating their benefits and difficulties from the perspective of both the mentor/ coach and those assigned to them.




Topics Covered

- The task envelope
- Time management
- Principles of human communications
- Resource management
- Principles of human behaviour
- Mentoring and coaching


Each of these topics covers a number of sessions, and addresses both the *hard* and *soft* dimensions of task management that are essential for any IS professional.

Introduction to Task Management - 1.11



The Task Envelope

- Task initiation
- Performing the task
- Supporting disciplines
- Handover




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These sessions focus on the task in hand - how it is initiated, how the conflicting constraints of cost, time, quality and content can be managed, the supporting disciplines that are necessary to deliver a quality product from the task such as Quality Assurance (QA), Configuration Management and Verification and Validation (V&V).

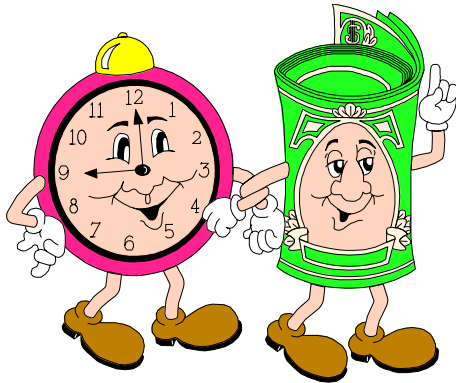
We also look at the delivery options and relationship with the *client*, whoever the client might be.

Introduction to Task Management - 1.12



Time Management

- Managing your time
- Managing meetings
- Managing the time of others




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In a human resource intensive industry like Information Systems, time is one of the most critical resources for undertaking a task.


This topic looks at the different requirements and techniques that are available to help improve the effective utilisation of this critical resource.

Introduction to Task Management - 1.13



Principles of Human Communications

- Introduction to communication skills
- Listening skills
- Interviewing skills
- Negotiating skills



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People are by far the most important and expensive asset a business owns. Although most people cherish their most valuable assets, unfortunately human factors are often totally ignored in the business environment, with predictably bad consequences.


This, and the subsequent sessions on human behaviour and mentoring, therefore form the human factors or *soft* element of the module.

The sessions discuss:

- The communication loop, message, media and method, the strengths and limitations of language, barriers and filters, the audience, working in groups.
- Difference between hearing and listening, different approaches to listening, the use of silence, reflective listening, listening to non-verbal messages.
- Interview as a social encounter, bias, behaviour, organisation of topics, formulation of questions, probing and clarification, closure.
- Negotiation looks at strategies, bargaining, concessions and settling.

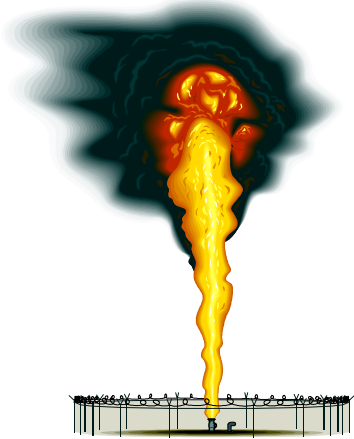
One human communications skill which is almost certainly required of the IS professional, is the ability to give effective presentations.

Introduction to Task Management - 1.14



Resource Management

- Managing internal resources
- Managing subcontractors
- Acquisition and contract management



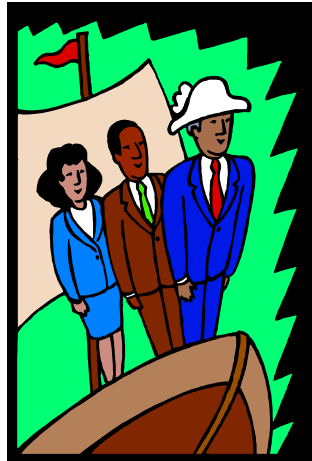
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Focussing on people again, but not to the exclusion of other resources, these sessions look at how to make the most effective use of existing resources, and how to obtain resources that the business does not currently own or employ.



Principles of Human Behaviour

- **Leadership and motivation**
- **Team factors**
- **Innovation, quality and productivity**



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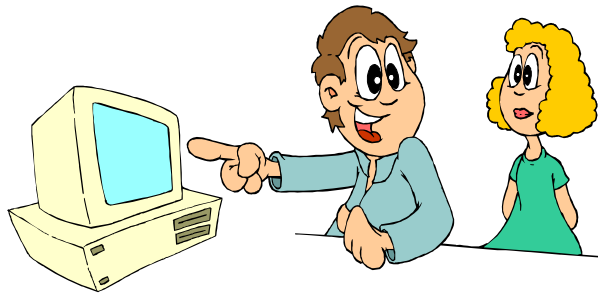
These sessions discuss:

- Leadership and behaviour preferences, the importance of leadership, Maslow's hierarchy, motivations and incentives, preferred learning styles.
- Team building, the balanced team, steps to a successful team, team roles.
- Approach to innovation, significance of quality and productivity, involvement and commitment.



Mentoring and Coaching

- **Mentoring and coaching roles**
- **Mutual gains and difficulties**
- **Pressure, stress and diminishing returns**



These sessions discuss:

- The mentoring role.
- Mutual gains.
- Mentoring difficulties.
- The difference between mentoring and coaching.
- Pressure, stress and diminishing returns.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 2 The Task Envelope - Task Success

V2.0


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This session concentrates on the definition of success of a task, and the difficulties of balancing conflicting requirements from a variety of stakeholders.

We look at the different dimensions of success:

- cost;
- time;
- quality;
- content;

and in particular, the difficulties associated with specifying quality within an Information Systems environment.



Task Envelope -Task Success - 2.2

Why Tasks Fail

- **Success not defined**
 - the wrong solution to the wrong problem in the operational environment
- **Faults**
- **Interface problems**

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The most common reason for tasks to fail is that success was never defined in the first place, and for one reason or another, the wrong product was made, often entirely in the wrong way.

If by some stroke of luck, the right product was built, then there are often faults in the product caused either by design errors or by assumptions made by some party who had not paid due care to the documented specification.

A task is rarely a totally independent activity, and it will depend upon other tasks being undertaken in parallel being performed by other teams – sometimes by other organisations. This can lead to interface problems, when the final product is combined with those of the other tasks.



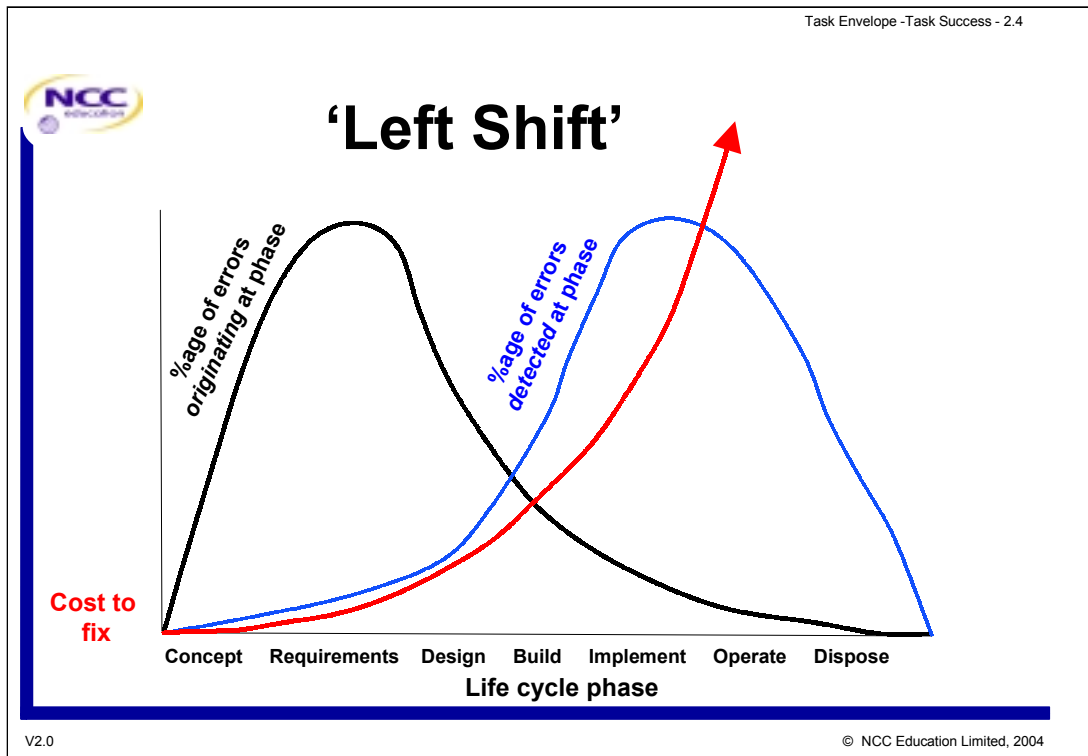
What Are the Major Problems?

- **Poor requirements capture**
 - Operational environments unconsidered
 - Uncontrolled changes
- **Unknown risks**
- **Estimation**
 - External constraints
- **Inappropriate testing**
- **Inappropriate process**

In an Information Systems environment the major problems encountered which lead to failed tasks and projects nearly all fall into the categories listed on the visual.

Consider:

- *What is the effect of each of these problems?*
- *What could one do to counteract them?*



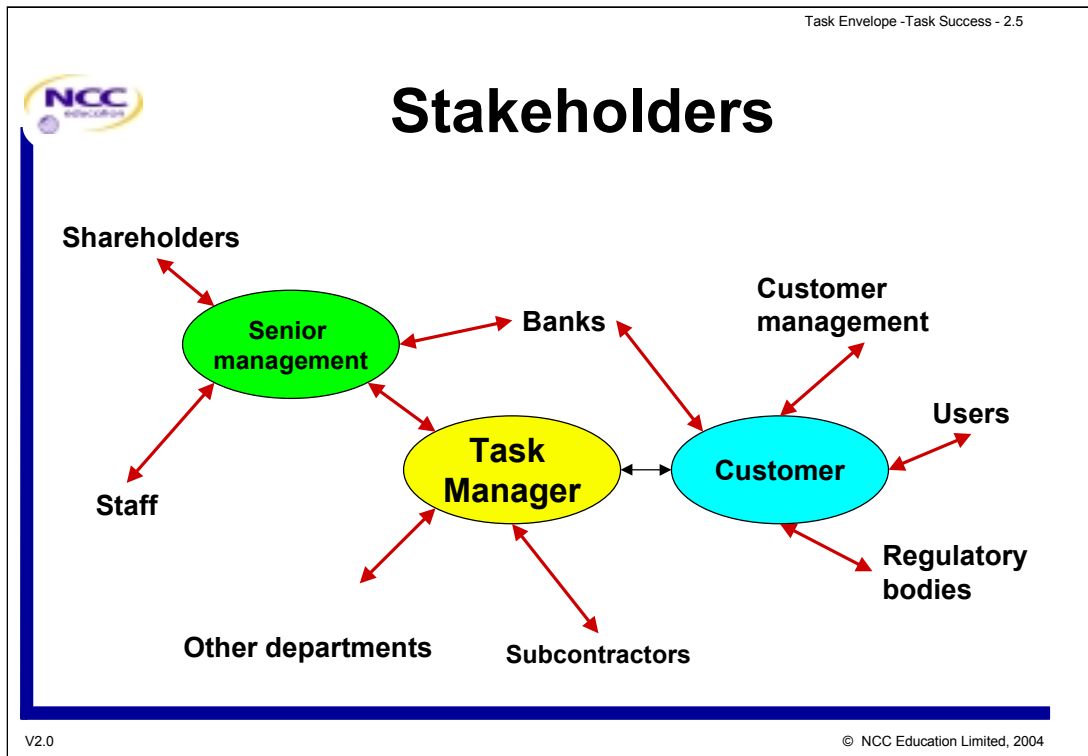
The previous discussion on why projects fail should have illustrated the fact that most failures have their origin at the early stages of the life cycle, even though they are not detected until later stages. When this is put alongside the *cost to repair* curve, it is clear that this is a major issue to be addressed.

The curves on this visual are characteristic, and present an incontrovertible rationale for validation and verification at the earliest possible life cycle stage – the term *left shift* is often used for this philosophy.

The question ‘*What can we do about this – we work in a commercial environment when the pressure is always to deliver faster and faster?*’ is usually raised at this stage.

Do students consider that going slower at the early stages might actually result in quicker delivery of a product which works, rather than a number of deliveries of products which have major faults?

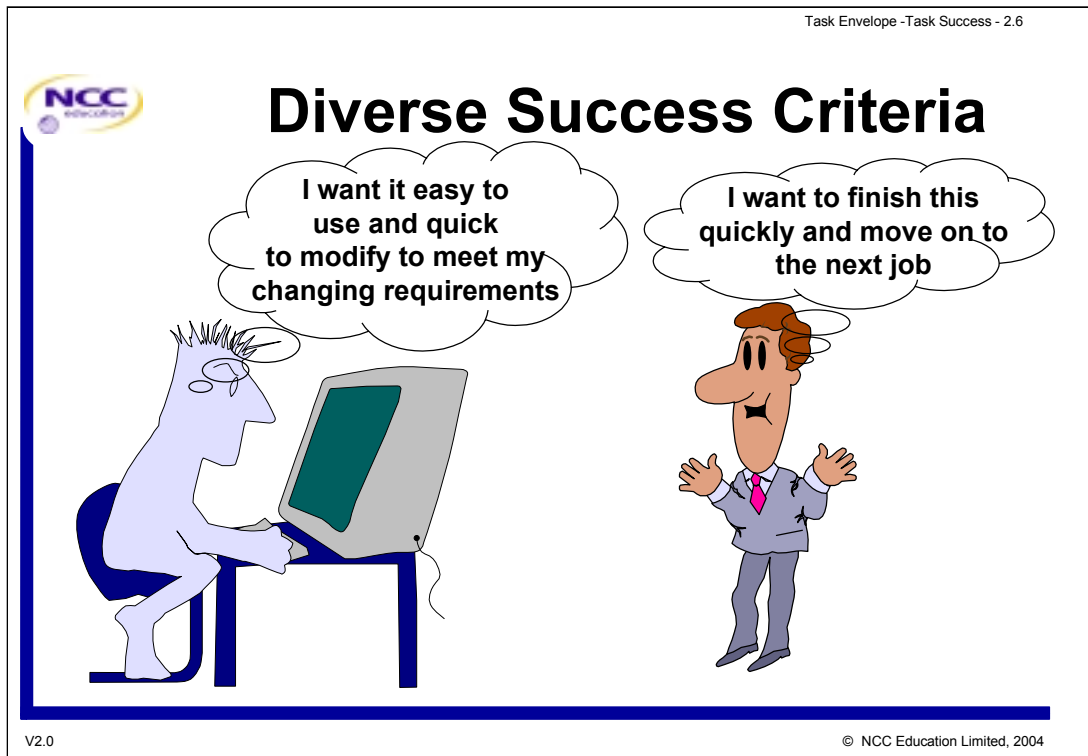
A very senior UK manager was once heard to ask the question “*Why is it that we never have time to get things right first time, but we always have to find the time to put things right after they've failed?*”, while banging his fist on the desk in frustration after yet another product recall.



A *stakeholder* is usually defined as anyone who can affect, or be affected by, the project and its deliverable.

The task manager, his team and his client are not the only stakeholders in the task.

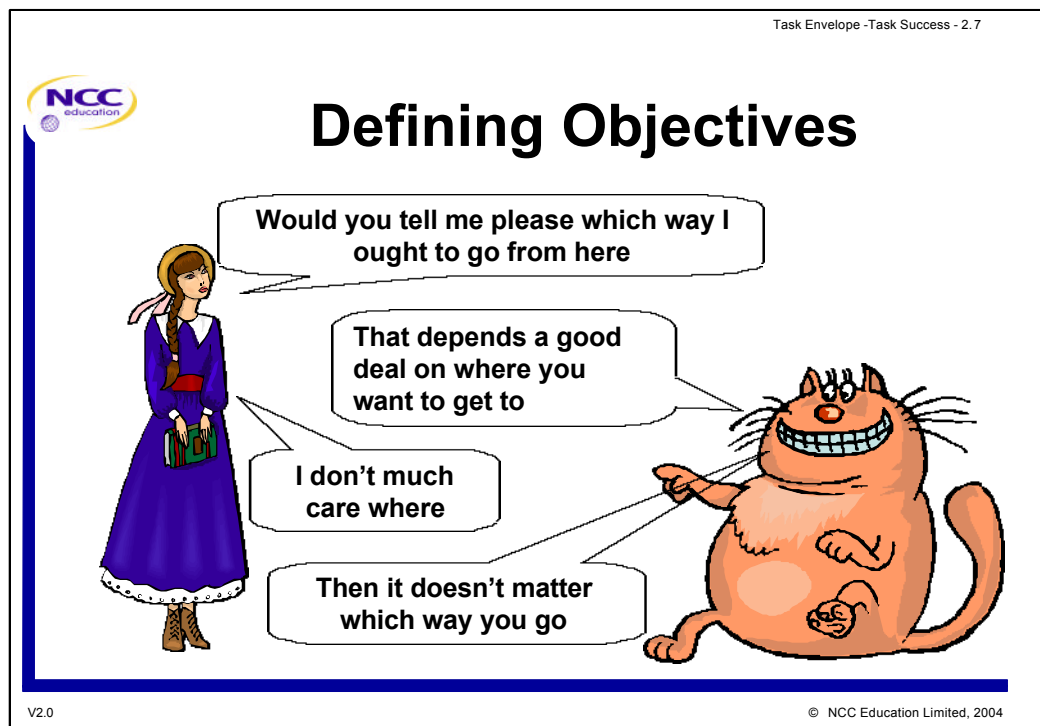
This visual shows a simplified diagram of the bodies that may have an interest (financial or otherwise) in the task in hand.



Each of the stakeholders identified on the previous visual will have different success criteria.

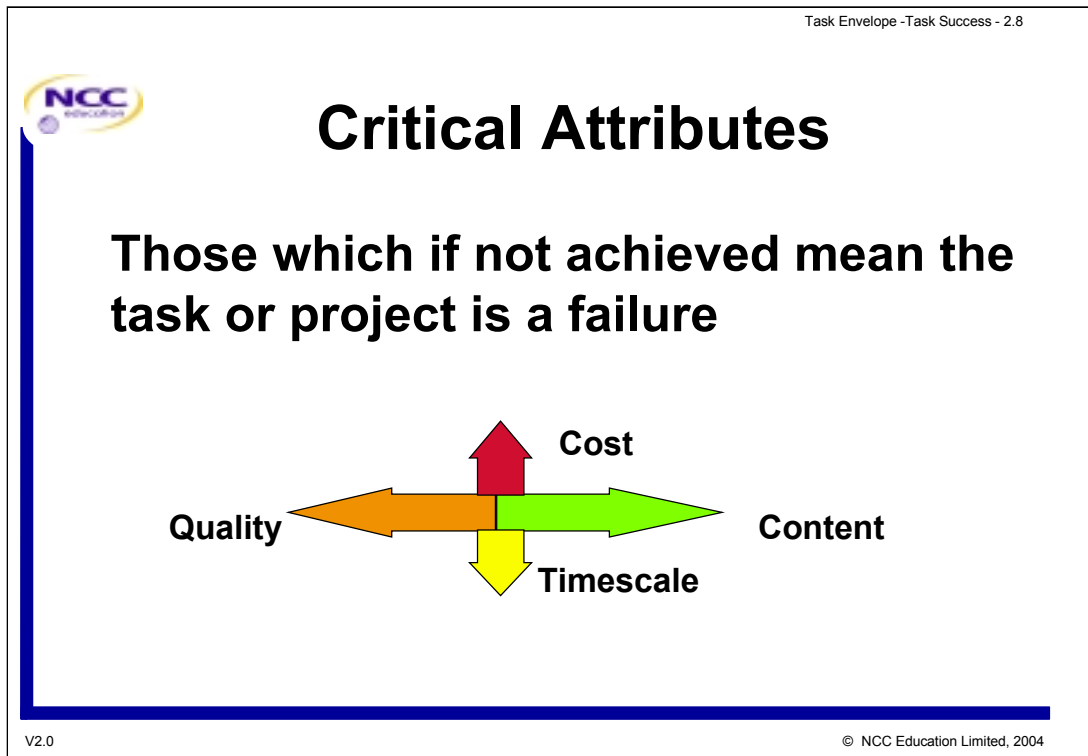
The students should attempt to identify the success criteria for each of the stakeholders that they have identified.

Are there any conflicts? If so, what can be done to resolve them?



The quote from Lewis Carroll's "Alice Through the Looking Glass", again emphasises the importance of defining objectives at the start of a task.

If clear objectives do not exist a task can go wrong in several ways, over achieving in one direction, and under achieving in other directions. To avoid these problems, an adequate product definition is needed with the critical attributes identified. This information will also form the basis of estimating the cost of undertaking the task.




A great danger is where the cost and time limits are precise and task content and quality is not. You may find the scope of the project growing, putting you under more and more pressure as the cost and time limits do not change. Often these limits come from different places – the finance director sets the cost target, the user manager sets the timescale target and the managing director sets the quality targets. You become a ping pong ball batted between all the parties, and only you can lose.

A precise documented picture of the task and what is to be delivered covering all the above dimensions, is the only way to avoid these pitfalls.

The challenge then becomes to obtain agreement between all the stakeholders on the documented parameters before work commences.

Once work has commenced against this agreed documented specification, then changes should only be allowed under very controlled circumstances.

Task Envelope -Task Success - 2.9



Budget

- Has the task met its budget targets?
- What could cause the answer to this question to be “No”?

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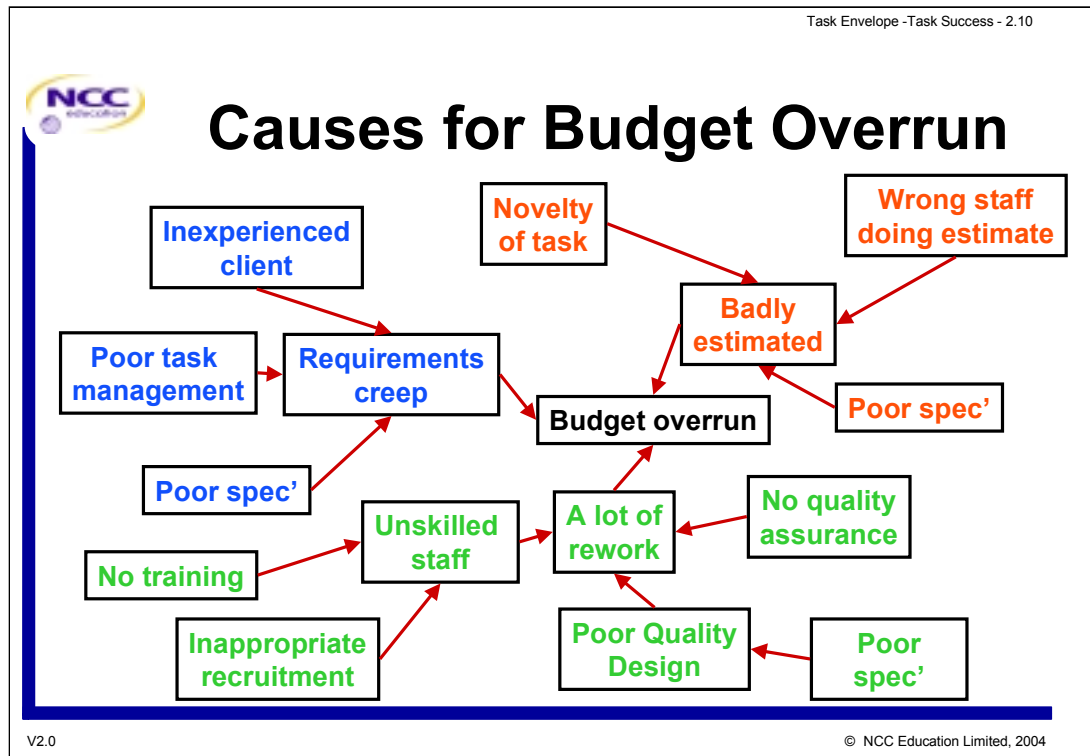
This and the following visuals form the basis of a discussion on the possible causes which could lead to failure in each dimension.

Techniques such as the mind map or the Ishikawa fish bone could be used.

- Are there any common cause problems that have been identified in each of the dimensions - if so what could be done to prevent the problems occurring?

Note:

- An example of a *mind map* is shown on the next visual.
- The *Ishikawa fish bone technique* is detailed in Sarazen, J S, *The Tools of Quality, Quality Progress*, July 1990.



This is the beginning of a mind map for budget overrun causes. It is simply drawn up by brainstorming the possible causes of failure, and then further exploring what may lead to those causes occurring.

Already it can be seen that an obvious common cause for budget overrun is a poor specification of task. If this also occurs on the other mind-maps, then it is a significant indicator that something needs to be done about it. This can be achieved by exploring the reasons why poor specifications happen, and trying to put into place preventative measures before the potential problem becomes a reality.

Consider how the 'left shift' concept could address these issues.



Timescale

- Has the task met its timescale targets?
- What could cause the answer to this question to be “No”?

See the notes on the previous visual.



Content

- Does the information system do what it needs to?
 - Completely?
 - Correctly?
- What could cause the answer to this question to be “No”?

See notes on Visual 2.10.

Sometimes referred to as *scope* or *purpose* – product quality will be measured solely on the achievement of *fitness for this purpose*.

Product scope will be a combination of *functional* and *non-functional* requirements. Broadly, functional requirements are *what* it should do, non-functional requirements are *how well* it does them.

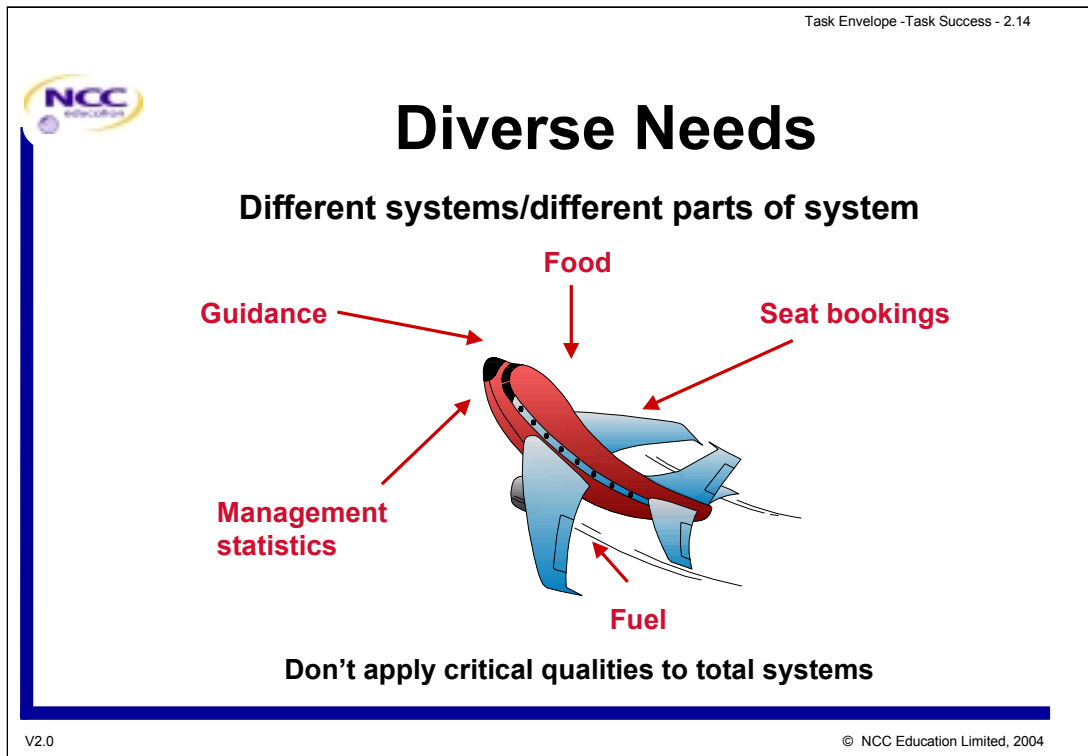


Quality

- **Does the system meet its non-functional requirements?**
 - Usability
 - Maintainability
 - Availability
 - Reliability
- **What could cause the answer to this question to be “No”?**

See notes on Visual 2.10.

In addition, it is worth noting that quality is rarely a single entity, and first needs to be broken down into its constituent parts. The reasons for failure to meet each of these non-functional or quality requirements are likely to be very different, and it may be more appropriate to treat them separately in this exercise.



One result that may have come out of the previous discussions, is that different parts of the overall system have very different criteria for success, and it is often inappropriate to apply the same stringent criteria to all portions or components of the system.

For example, one would expect high usability criteria to be placed on the seat booking system, and high reliability criteria on the guidance and fuel systems. Each of these criteria, should, as far as possible be specified quantitatively.

Each of these different non-functional requirements, has different implications on the development of the system component and hence on the cost.

Consider the type of approach necessary in:

- *the development of a system with high usability criteria?*
 - *one obvious route is by the use of prototyping, and early involvement of the users of the system.*
- *the development of a system with high availability criteria?*
 - *one route would be by the introduction of redundant components, which would obviously have an impact on the cost of the implementation, and subsequent maintenance costs.*



Quality Specification

- Identify distinct product components
- Specify critical characteristics and criteria
- Select development approach
- Map characteristics to metrics
- Use metrics to monitor quality

So, it is necessary to determine all the non-functional requirements to ensure that the appropriate development approach is used, and to be able to monitor the task in hand.



Internal and External Quality

- **External**

- How good is the product?
- Does it meet users needs?
- Measured and assessed at end?

- **Internal**

- How good is the engineering?
- How good are the components?
- Can be measured as we develop?

It is also necessary to be aware that quality can be, and needs to be, specified and assessed from two main viewpoints, and these should not be confused.

The external view is the one which is often associated with the users, and it is necessary to include all the external parameters in the specification of the product of the task. The one problem with this view is that these characteristics can only be assessed when the product is complete, and often already in use.

This has led to the development of the internal view of quality as described on the visual. There are techniques that can be applied to assess the quality according to this view during development, and hence before the users have the opportunity to complain.

However, it should be noted that, although significant research has been and is being undertaken on the relationship between the internal and external quality, there is no proven relationship which will guarantee that if you have good internal quality then you will also have good external quality.

Task Envelope -Task Success - 2.17



How Can We Do It Better?

- **Better management**
- **Appropriate process**
- **Better use of people**

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Some of the key principles therefore to improve the success rate of tasks and projects are to ensure that:

- the management of the task is improved;
- appropriate processes are applied to achieve the required quality levels;
- people are more effectively utilised and managed:
 - the fact that this people dimension is believed to be of such significance is the reason why a major element of this module on *task management* covers the *people issues*, with respect to communication and behaviour related skills.



Let's Play Consequences


- **Wrong structure**
 - ?
- **Wrong process**
 - ?
- **Wrong management**
 - ?

This session concludes with an alternative look at success.

- What are the consequences of a wrong task structure?
- What are the consequences of a wrong process being applied?
- What are the consequences of the wrong management style?

The outcome of this debate should convince the students that it is important to consider each of these issues carefully prior to the start of any new task, and provide questions which will hopefully be explored and possibly answered during the course of the remaining sessions of this module.

Task Envelope -Task Initiation - 3.1


**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 3
Task Envelope - Task
Initiation**

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This session discusses some of the considerations that need to be made when a new task is initiated.

We look at:

- the life cycle of the task;
- the importance of planning, and how one might use a software tool to assist in the planning process;
- the principles of cost estimation – we explore some of the problems associated with software cost estimation and how they can be overcome;
- what we mean by an *estimate* and the type of information that needs to accompany an estimate.



Task Initiation Checklist

- **Task manager**
- **Task objectives**
- **Task title/terminology**
- **Technical options/risk**
- **Feasibility/business case**
- **Acquisition strategy**
- **Termination options**

The visual shows a starting point for a checklist for task initiation.

- Task manager – Must be appointed.
- Task objectives – They must exist, and hopefully be consistent with corporate objectives. It should be possible to translate these into quantitative task success criteria.
- Task title/terminology – The importance of an appropriate title for a task should not be underestimated. A title with a positive association is more likely to engender enthusiasm amongst the team. Any terminology in the description of the task should be understood by all who are involved with the task.
- Technical options/risk – The options that are open to the task manager should be explored and documented, along with the associated risk of undertaking each option.
- Feasibility/business case:
 - Is the task feasible?
 - Where is the business case for undertaking the task?
 - Who is the sponsor?
- Acquisition strategy:
 - Is it necessary to subcontract any of the task?
 - If so, how should that be approached?
- Termination options – Who has the authority to terminate the task, and under what conditions?



A Journey of a Thousand Miles....

- **Stakeholders**
 - motivations
 - success criteria
- **Real-world constraints (quantitative)**
 - time cost quality
- **Resource 'qualitative' aspects**
- **Project 'overhead' resources**
- **History**

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More items that require consideration at initiation:

- Who are the stakeholders, and what are their priorities, motivations and success criteria?
- What constraints apply?
 - What are the timescales and why?
 - What is the budget?
 - Are there any implementation constraints that affect the design process?
- What skills and resources are needed?
- What overheads must be included in the costings?
- What is the history of the task?
 - Has anyone done anything similar before?
 - What is the history of the team that has been allocated?



Project Structures

- **Organisational structure**
- **Product breakdown structure**
- **Work breakdown structure**
- **Chronological structure**
- **Cost accounting structure**

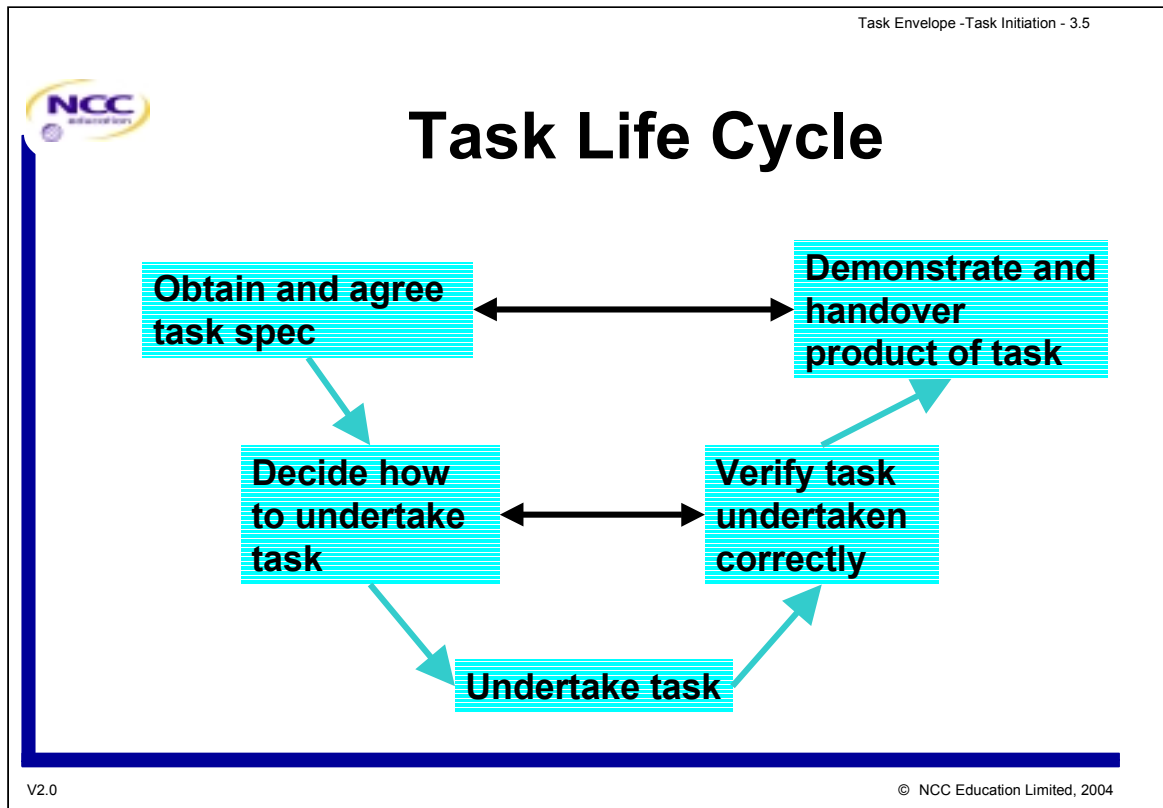
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What are the structures that need to be in place before a new task can get underway?

This visual shows some that require consideration:

- Organisational structure – Who are the team, and what is their relationship with the rest of the organisation? What is the reporting line?
- Product breakdown structure (PBS) – How does the task product break down? Has any initial design work already been done as part of the feasibility study?
- Work breakdown structure (WBS) – How does the task break down into sub-tasks to enable planning?
- Chronological structure – How do the work breakdown structure, and the product breakdown structure meet the delivery requirements of the client?
- Cost accounting structure – How are the costs of the task to be monitored and accounted for? Is it necessary to have a single bucket of budget for the entire task, or would it be more beneficial to allocate the budget across the sub-tasks?



This visual may be recognised by many of the students. It illustrates that whatever the task in hand, a structured approach to the task can assist in the planning and estimation processes.

This is drawn at a very high level, and consists basically of:


- What is to be done?
- How is it to be done?
- Do it.
- Has it been done correctly or adequately?
- Demonstrate it to sponsor/user.
- Is it accepted?
- Hand it over – complete the task.

The significance of the black arrows is to show the relationship between the inputs and outputs.

- *Do the students agree with this structure?*
- *How, if at all, should it be amended?*

There is no right answer here, but it is important to ensure that the process is thought about before embarking on the task in hand, and drawing the process in the form of a life cycle can assist in this planning process.

Task Envelope -Task Initiation - 3.6



Resources Required

- Time
- Money
- People
- Materials
- Equipment
- Information

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This visual shows some of the resources that are needed when undertaking any task – these can easily be translated into resources for an Information System task.



Evaluate Alternatives

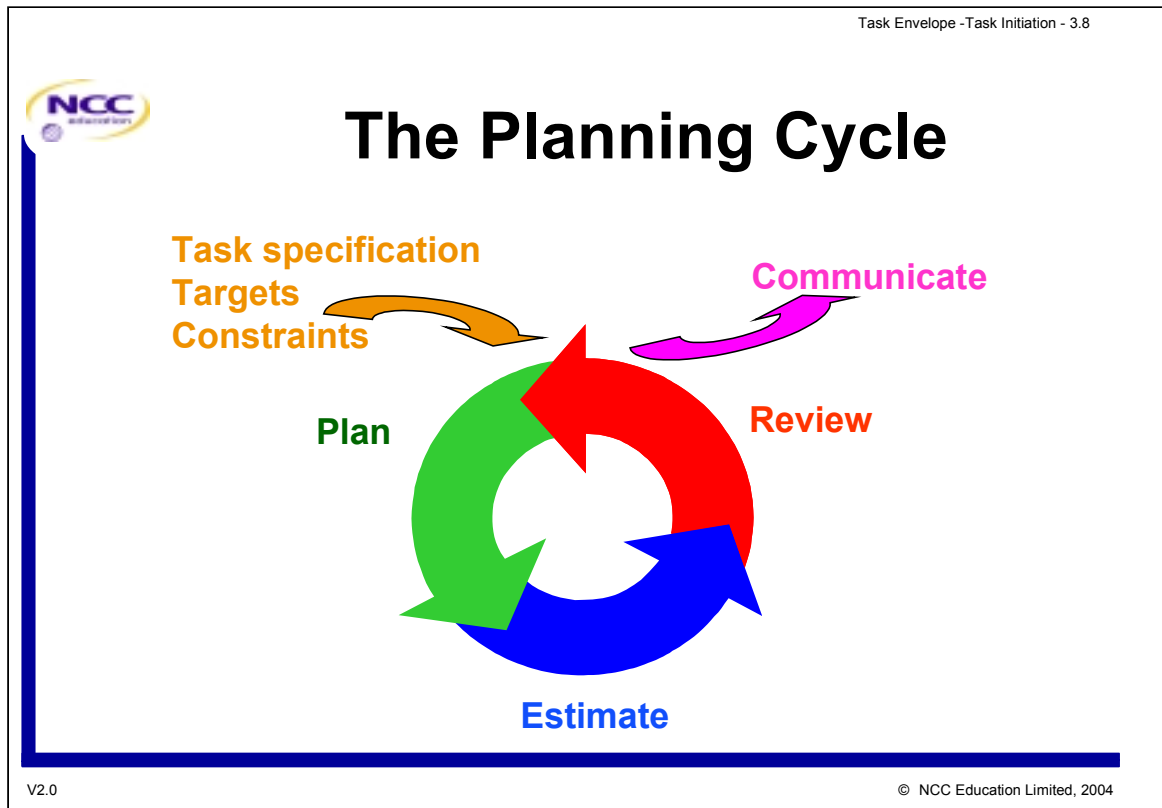
- Development strategy
- Hardware platform
- Technical methods and tools
- Project team structure
- Resource deployment
- Use of external resources

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This visual shows the alternatives that require evaluation prior to embarking on an Information System related task. Just a few of the alternatives are listed below.

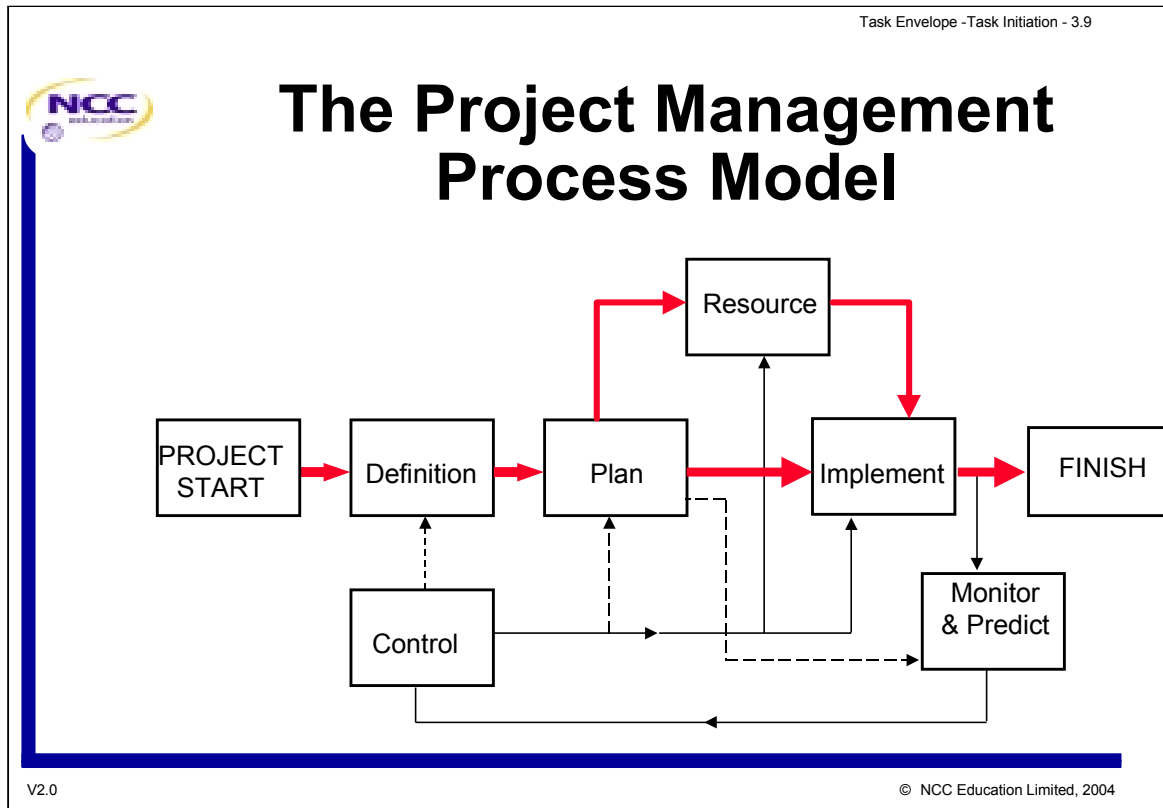
- Development strategy – either incremental or *big-bang*.
- Hardware platform – networked PCs or dumb-terminals on a server.
- Technical methods and tools:
 - structured or object-oriented methods?
 - should tools be purchased or will tools currently in use in the organisation suffice?
- Project team structure – flat or hierarchical?
- Resource deployment – does every member of the team have a copy of each of the tools being used?
- Use of external resources – is it necessary to recruit temporary contractors or subcontract part of the task?



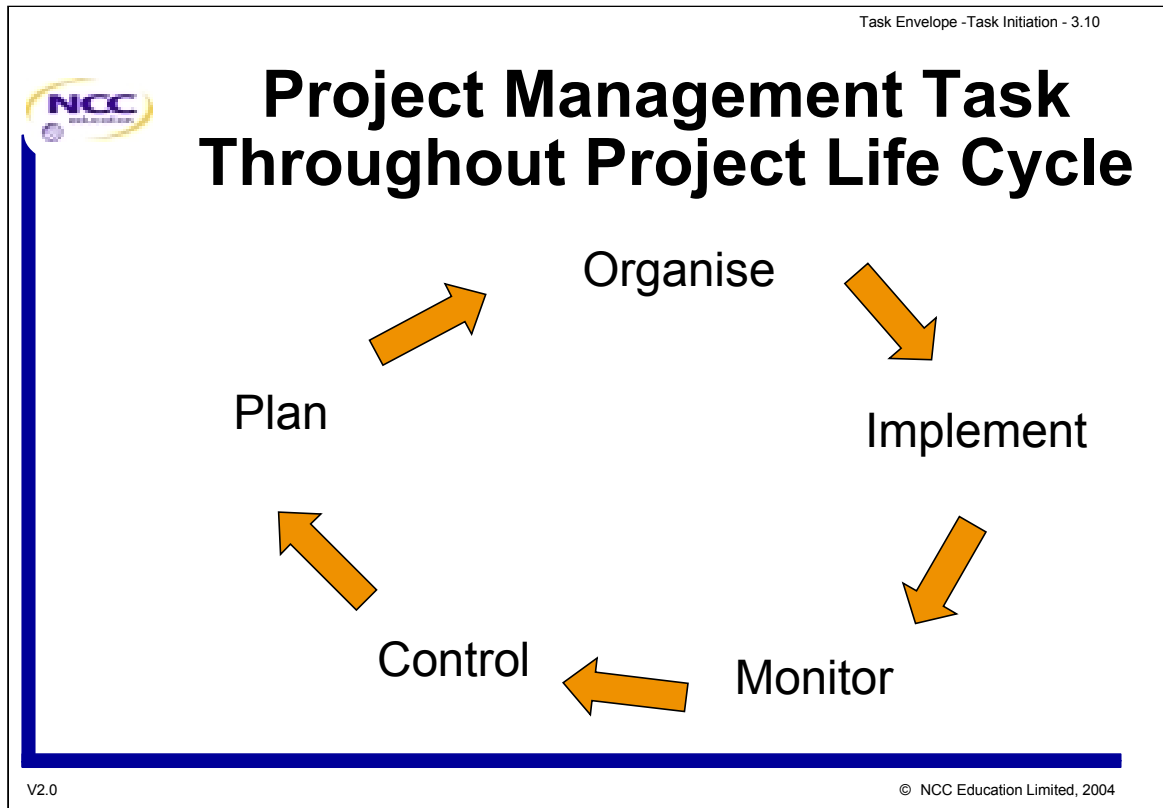
Once the initial information collection has been completed, and planning cycle can begin in earnest. It should be emphasised that planning is not only undertaken at the outset of the task, but plans should be continually reviewed and re-estimated throughout the task.

The frequency of each cycle depends on the criticality and complexity of the task itself, but during the initial phase it may appear to be a constant activity.

The next few visuals describe the planning cycle in more detail.



The project management process model outlines a logical flow of defining and implementing project requirements, and adoption of an effective control mechanism, which provides a continuous feedback on project performance. That feedback may result in a redefinition, replan or rework if the required standards are not being achieved.



It cannot be overemphasised that this is a continuous, iterative process throughout the whole duration of the project.

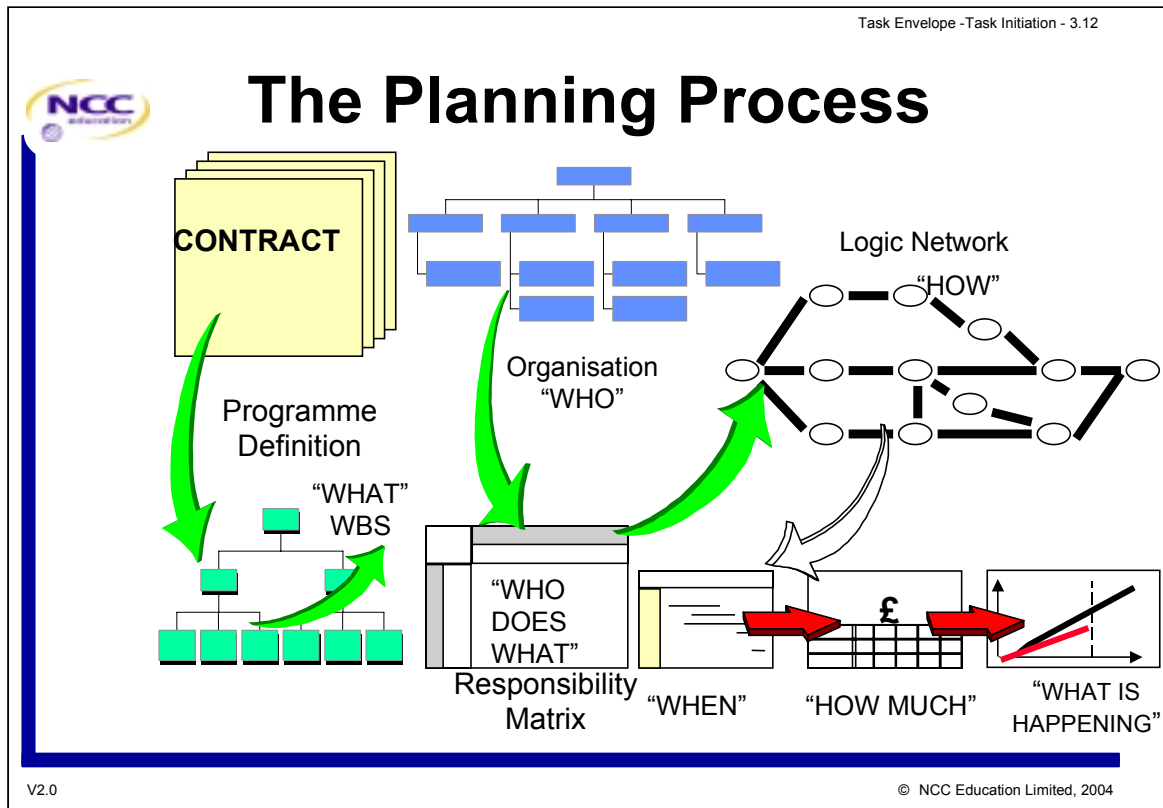


If You Fail to Plan You Plan to Fail

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Project managers need to be proactive and reactive. Project circumstances are always changing, so there will always be a need to be somewhat reactive. However, the degree of *crisis* management – *firefighting* - will be largely determined by the effectiveness of the planning that takes place at the start of the project. That planning should take into account the areas of uncertainty and risk, with contingency plans identified.



This diagram outlines a practical application of the project planning process, defining the techniques that can be used in the effective definition, planning and control of a project. This should start from the earliest possible time, advisedly pre-contract.

A logical sequence of defining what is to be done, who is to do it, how it will be done, by when and for how much, should ensure that nothing important is missed.

It is very easy to believe the requirements are fully understood and to immediately start to draw a network or bar chart. But the network is only a logical representation of what needs to be done, and identifies the sequencing and dependencies of the work packages identified at the bottom of the Work Breakdown Structure (WBS). Starting with a work breakdown focuses the mind on what needs to be done, before introducing additional parameters, like organisation and logical sequence.

Defining *who* is to do what is a crucial early stage in the planning process.

Responsibility for work packages needs to be defined early enough to enable detailed planning to take place by the individual assigned to them. Formal definition of who is to do what also clarifies departmental responsibility, particularly important in a matrix organisation, where it is not always clear.

Detailed planning of the high level (networked) work packages will then define the precise scheduling of the lower level activities. Identifying and costing labour and material resources for these activities will enable a budget to be allocated at the activity level, which can be aggregated up to the project level.

A firm baseline is then fixed in terms of budget to be expended over time, which the project can then be monitored against as it progresses.



Work Breakdown Structure - 1

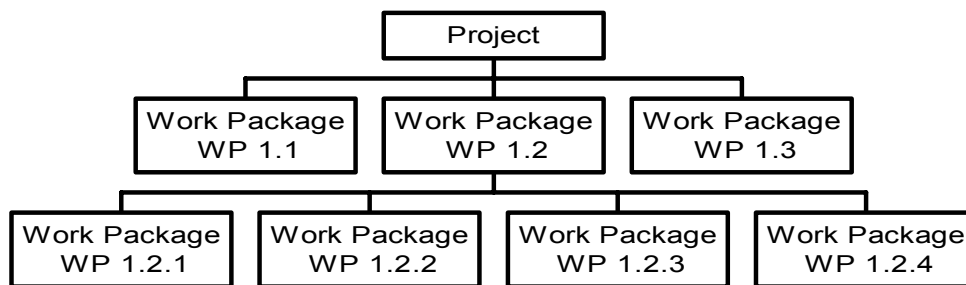
Purpose:

- Defines the products, components, work tasks and services required to produce the end product
- Relates elements of work to each other and to the end product
- Provides a framework to summarise work performance

Creation of the Work Breakdown Structure (WBS) is normally the point of entry in to the planning cycle. It describes *what* is to be done, decomposing the overall task into manageable units.



Work Breakdown Structure - 2



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These units – typically of a relatively short duration, perhaps between 5-10 days – are sometimes known as *workpackages*, and given a WBS reference number.



Organisation Breakdown Structure

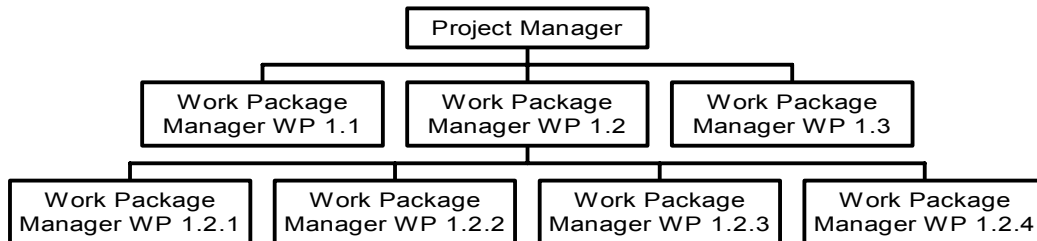
Purpose:

- Identifies members of the programme team responsible for the performance of contract work
- Defines the organisation framework for cost account planning and work performance reporting
- Provides a framework to summarise work performance

The next job is to decide *who* does what, in a similar framework to the WBS.



Organisation Structure



Organisation Breakdown Structure

V2.0

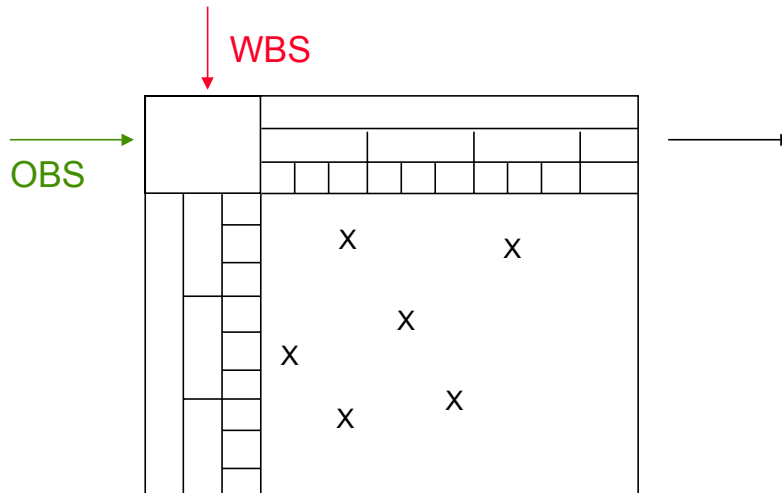
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When preparing an Organisation Breakdown Structure (OBS), it is often easiest to start with the company organisation chart. The relevant departments represented in the project OBS can then be selected and replaced by named individuals.

These names can be the points of contact in those departments; the resource managers; or for short-term needs, the people doing the work



Responsibility Assignment Matrix



A Responsibility Assignment Matrix (RAM) is a useful way to graphically illustrate who is doing what. The RAM can be used as a control tool in its own right, by utilising a colour or coding system for indicating work package status (e.g. open, closed, authorised, etc).



Cost Account

The cost account is a key management control point

- **Functional responsibility is assigned**
- **Work packages are planned and organised**
- **Performance is measured and reported**
- **Variances are identified and analysed**
- **Corrective action planning takes place**
- **Information is summarised**

Visibility and control are essential characteristics of project management. The cost account is the point in the work breakdown structure for which it is deemed appropriate for an individual (say, a team leader) to be given responsibility.

The individual (Cost Account Manager/Work Package Manager) administers control over that area of responsibility and provides visibility to the project manager of progress against the baseline.



Cost Account Manager (CAM)

The cost account manager:

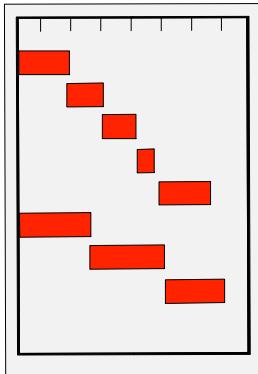
- is responsible for work package planning
- is accountable for achieving cost, schedule and performance goals
- has full authority to carry out agreed goals

It is evident from the visual that the responsibility of the *cost account manager* is similar to that of the *project manager*. The reason for this is to devolve responsibility for achievement down to a level which optimises the chances of success. It should enable project managers to spend more time on strategic planning, customer care, supplier management, etc., which are fundamental tasks often neglected due to time pressures.

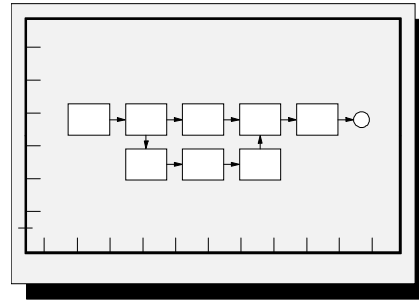


Planning Techniques

Bar charts



Activity networks/ PERT charts



Several well recognised and documented techniques exist for planning.

They all provide the user with a graphical approach to viewing the relationship between the tasks, showing dependencies and working out minimum and maximum time allocations.

These techniques are virtually always driven by a software tool.

Consider the applicability of tools to a particular project. Microsoft Project might be very good for smaller projects, but it would be unlikely to have the power to contribute to control and monitoring in a major project environment, where much more sophisticated tools such as Artemis and Primavera will be more usually seen.




Bar Chart versus PERT Chart

<i>Characteristic</i>	<i>Bar chart</i>	<i>PERT chart</i>
<i>Timing</i>	Clearly shown	Not clear
<i>Logic</i>	No logic shown	Shows dependencies clearly
<i>Familiarity</i>	Easy to understand	Needs more explanation
<i>Presentation</i>	Can be scaled down to A4	Plans hard to read and do not scale down

Some of the characteristics and pros and cons of the Bar and PERT chart techniques are shown here.

Many of the planning tools provide alternative views on the plan, to enable the same information to be viewed and printed in either form, depending on the requirements of use.

Task Envelope -Task Initiation - 3.22



Tool Parameters

- **Activities**
 - work required plus waiting periods
 - realistic
- **Events**
 - start-finish
- **Relationships**

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The information that a tool will need in order to create a planning chart of the task is shown in the above visual.

- What are the activities to be performed – are there any required delays or start time constraints on any of the activities?
- What events are needed – receipt of final specification or handover of product?
- What are the relationships (if any) between the various work items?



Planning Example

Software Project Planning in the CMM

The purpose of Software Project Planning is to establish reasonable plans for performing the software engineering and for managing the software project

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This and the following four visuals, include extracts from the Capability Maturity Model (CMM) as it refers to Project Planning for Software Development. The CMM was developed at the behest of the US Department of Defense by the Software Engineering Institute at Carnegie Mellon University, as part of a programme to improve standards in the software industry. It is now becoming widely used internationally.

Further information is available on the SEI website at: www.sei.cmu.edu

Although this is primarily written for software projects, it should be noted that the *project planning* principles included apply to any sort of project.



The Goals of Software Project Planning

- **Software estimates are documented for use in planning and tracking the software project**
- **Software project activities and commitments are planned and documented**
- **Affected groups and individuals agree to their commitments related to the software project**

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Planning involves developing estimates for the work to be performed, establishing the necessary commitments, and defining the plan to perform the work.

The software planning begins with a statement of the work to be performed and other constraints and goals that define and bound the software project (those established by the practices of the Requirements Management key process area). The software planning process includes steps to estimate the size of the software work products and the resources needed, produce a schedule, identify and assess software risks, and negotiate commitments. Iterating through these steps may be necessary to establish the plan for the software project (i.e., the software development plan).

This plan provides the basis for performing and managing the software project's activities and addresses the commitments to the software project's customer according to the resources, constraints, and capabilities of the software project.



The Top-Level Activities Performed for Software Project Planning - 1

- The software engineering group participates on the project proposal team
- Software project planning is initiated in the early stages of, and in parallel with, the overall project planning
- The software engineering group participates with other affected groups in the overall project planning throughout the project's life
- Software project commitments made to individuals and groups external to the organisation are reviewed with senior management according to a documented procedure

Continuing the extract from the CMM – students should consider the potential effectiveness of these statements, and whether they could be applied in their own organisations and culture.

Compare the recommendations of the CMM with the requirements of other standards such as ISO 9001 or other local standards.



The Top-Level Activities Performed for Software Project Planning - 2

- A software life cycle with predefined stages of manageable size is identified or defined
- The project's software development plan is developed according to a documented procedure
- The plan for the software project is documented
- Software work products that are needed to establish and maintain control of the software project are identified
- Estimates for the size of the software work products (or changes to the size of software work products) are derived according to a documented procedure

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Continuing the extract from the CMM – students should consider the potential effectiveness of these statements, and whether they could be applied in their own organisations and culture.

Compare the recommendations of the CMM with the requirements of other standards such as ISO 9001 or other local standards.



The Top-Level Activities Performed for Software Project Planning - 3

- Estimates for the software project's effort and costs are derived according to a documented procedure
- Estimates for the project's critical computer resources are derived according to a documented procedure
- The project's software schedule is derived according to a documented procedure
- The software risks associated with the cost, resource, schedule, and technical aspects of the project are identified, assessed, and documented
- Plans for the project's software engineering facilities and support tools are prepared
- Software planning data are recorded

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Continuing the extract from the CMM – students should consider the potential effectiveness of these statements, and whether they could be applied in their own organisations and culture.

Compare the recommendations of the CMM with the requirements of other standards such as ISO 9001 or other local standards.



Management Plan

- **Validates the business case**
 - **Cost**
 - **Timescale**
 - **Organisation**
 - **Resources**
 - **Risk**
- **Including overheads e.g. reviews, meetings, documentation**

The main outputs of the planning process are three related but distinct deliverables:

- A management plan.
- A technical plan.
- A quality plan.

It may be decided to combine all of these into a single document, but this depends on the size and complexity of the task.

The management plan includes the information shown in the visual.



Technical Plan

Identifies:

- Architectures
- Products/deliverables
- Dependencies
- Alternatives/variables
- Structured according to chosen life cycle model

The technical plan, concentrates on the possible technical strategies and solutions, and the deliverables that are required.



Quality Plan

- **Quality criteria by stakeholder**
- **Validation and verification strategy**
- **Techniques and methodologies**
- **Configuration management**
- **Documentation standards and index**
- **Audit mechanism**
- **Post implementation review**

The quality plan outlines the quality requirements, and the strategies that are to be employed to ensure that these quality requirements are met. Many of the techniques listed here are covered elsewhere in other sessions of this module.



Planning

- **Iterative from 'initial' to 'complete' levels**
- **Real world**
- **Robust**
- **Based on local culture and experience**
 - life cycle/risk
- **Total coverage**
 - management/technical/quality

To recap on planning:

- It is an iterative process that continues from the beginning of the task to its completion.
- It is recognisable in the real world – team members can associate the plan with their work at all times.
- Even though it is expected to change, the overall structure of the plan should be robust.
- Local and organisational culture and experience should be embodied into the plan, and the life cycle and associated risks taken into consideration.
- Each of the management, technical and quality planning dimensions are covered either in a single document, or in three separate documents.



Budgets

“This is what I’ve got, now what can I do with it?”



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Before we begin to look at cost estimates, let's have a brief look at budgets.

In many circumstances, budgets are often allocated prior to real need and requirements being identified or specified. This is simply a pot of money which has to last over a certain period to enable certain functions to continue to operate.

Budgets must not be confused with estimates, and must always be treated as separate items, despite that the costs have to come out of the budget it must be remembered that one is a *target* and one is an *estimate*, and they should be managed accordingly.



Information System Cost Estimates

Forecasts:

- Effort for production and maintenance
- Duration
- Staffing levels




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In the Information System world we often talk about *cost estimation* when we actually mean estimates of staffing effort for production and/or maintenance, project duration, or staffing levels for a project.

The remainder of this session is concerned with estimating effort and duration not necessarily translating those figures into costs or prices, as these are dependent upon local cultures and customs.

Task Envelope -Task Initiation - 3.34



An Estimate

An estimate is

- **An unbiased prediction**
 - most likely value
 - qualified by upper and lower bounds
- **Understandable within the context of**
 - assumptions
 - inherent risk
 - estimation method
- **Transitory**
- **An input to other processes**

An estimate is not

- **A target or constraint**
- **A planning value**
- **A single fixed value**
- **A price**
- **Fixed for eternity**
- **An end in itself**
- **Least possible value with non-zero probability**

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An estimate should be an *unbiased* prediction. Which means it is the most likely value, qualified by upper and lower bounds.

In order that someone else can understand and use an estimate, it is also necessary to specify:

- the assumptions that were made when the estimate was made;
- the risk associated with the estimate;
- the method used to make the estimate.

Estimates must be regarded as transitory (i.e. date sensitive) as an estimate is only meaningful at a particular point in time and will be superseded later.

An estimate is also input to other processes. It should be used in bidding, planning, process monitoring.



Estimate Scope

- **What 'metrics'?**
 - defined units (hours, days)
- **Which activities/tasks?**
 - management?
 - validation?
 - debugging?

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It is important to be sure that the scope of an estimate is well-defined by both the estimator and the estimate user.

The estimator must state the unit in which the estimate is delivered.

For effort this may be staff hours or staff days but it is important to ensure that any assumptions about how many hours there are in a day and/or how many days there are in a week are clearly understood.

For duration, it is necessary to be clear whether days are calendar days, elapsed working days, or shifts.

It is also important to be sure that it is clear what activities are included in the estimate.

- Is management time included?
- Is validation time and quality assurance effort included?



Bounds

- **Quantify the accuracy of an estimate**
- **But may not be accurate themselves!**
- **Depends on how they are calculated**
 - **state method used**

It is important to provide some ideas of how trustworthy an estimate is. One way of doing this is to present the upper and lower bounds on an estimate. These may be regarded as the optimistic/pessimistic values but should have probabilities attached to them i.e. the lower bound can be defined as the value that has an 0.05 (or 0.01) probability of not being achieved, the upper bound has a 0.95 (or 0.99) probability of not being exceeded.

Information System staff often object to the concept of providing a lower bound to an estimate on the grounds that “senior managers will use the lower bound and ignore the other values”. This attitude is due to a misunderstanding of the purpose of estimates. Estimates used as inputs to the bidding process are required to assess the internal costs of producing a product in order to assess the best price to bid. There are factors other than profitability that can determine the price of a bid. However accurate assessment of profitability is important. Managers who use a lower bound to assess internal costs and hence determine profitability are only increasing the risk that their assessment of profitability is incorrect. Senior managers are allowed to make any pricing decision they like, what they should not do is ignore the real internal costs.

Similarly there should be no incentive to use the lower bound values for estimates to drive the planning process, since this only increases the risk of overrunning budgets and schedules. A planning process where full information about estimates is recorded and available to interested staff, helps to avoid situations where line managers are required to *manage* schedule and budget risks resulting from *political* estimates.



Assumptions

- **Explicit assumptions**
 - inputs to any estimation model used
 - ‘similar projects’ and specific adjustments if analogy is used
- **Implicit assumptions**
 - ‘normal conditions’
- **Must state any implicit assumptions that are conditional**

It is important to make explicit all the assumptions that have been made when an estimate is constructed.

This involves two stages.

- First you should state all the factors that were used to construct the estimate (these are your calculation assumptions and usually correspond to sizing measures – how big is the product expected to be?).
- You then need to consider other factors that might influence actual effort that were not used to construct the estimate. These are usually hidden in the underlying estimate assumption that the future will be similar to the past. For example, if your system has always been developed using C++, all your past history will relate to C++ and so your estimate will be based on the assumption that the language used will be C++. If the use of any other language is impossible or impractical then it is probably not worth mentioning. However, if there is a chance that development procedures will be changed to require the use of Java, this would have a substantial effect on your estimate.

You need to consider all implicit assumptions that may be overturned by the course of events. This is, of course, a risk!



Use of Estimates - 1

- **Throughout life cycle**
- **Feasibility and bidding**
 - **input to bid managers**
 - **least accurate but most important**
- **Programme management**
 - **input to release definition**

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The users of estimates vary throughout the task life cycle. It is important that estimators are aware of the requirements of the people who use the estimates to make sure that they provide appropriate contextual information with an estimate. It is important that users of estimates understand the basis of the estimates if they are going to use them constructively.

At different stages in the development cycle, estimates:

- are required for different reasons;
- are based on different information;
- are derived using different methods;
- have different degrees of accuracy.

For this reason, estimation is best considered as a process in its own right.

Project estimates are also an important input to the programme management and release definition activities. However, the complexities of programme management are not covered in this module.



Use of Estimates - 2

- **Project and task planning**
 - **input to project managers**
 - **usually increased accuracy but constrained by contract**
- **Project and task monitoring and control**
 - **input to project managers**
 - **feedback of actuals can refine estimate**

Estimates are also used during the task planning process, either at the initiation of the task or when re-planning is required. These estimates are often more accurate than those issued during the bidding process, but do have a tendency to be constrained by the contract and the allocated budget.

When actual effort data is collated, it is useful to use this during the monitoring process to amend the estimates, so the effort remaining to complete the task can be calculated with increasing accuracy. Care must be taken however, that the original estimates are not lost during this re-estimation activity. If the original estimates are lost, then the task will reach completion with 100% accuracy of estimation, as the last estimate (being the one made at the latest date) will be the only one available for comparison with the final actual data.



Summary

- **It is very difficult to make predictions especially about the future**
- **Software estimation has special problems**
- **Improved by an estimation processes calibrated to local conditions**
 - **measures**
 - **models**
 - **procedures and standards**

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Estimation is particularly difficult in the field of software intensive systems because we are usually producing novel products using new methods that depend on human expertise.


However, you can usually improve your estimation by using a structured estimation process calibrated to a specific organisation/development group. Calibration in this sense means that:

- the sizing measures you use must reflect the type of product you produce;
- the estimation models must be based on locally collected data;
- the estimation process must be suited to the requirements of your development process and management procedures.

You need to establish procedures not just for making an estimate but also for putting realistic bounds on your estimate to indicate its accuracy and consider the risks associated with your estimate.

Consider how an organisation might improve its planning and estimating procedures.

- *What information is required?*
- *What hurdles might need to be jumped to make such procedures work effectively?*



**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 4
Task Envelope - Monitoring
and Control**


Task Envelope -Monitoring and Control - 4.1

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In this session we are going to discuss some of the techniques that can be used to monitor the progress of the task and project, and look at some of the difficult decisions that the task manager has to make when confronted with slippage and overspend.


Task Envelope -Monitoring and Control - 4.2

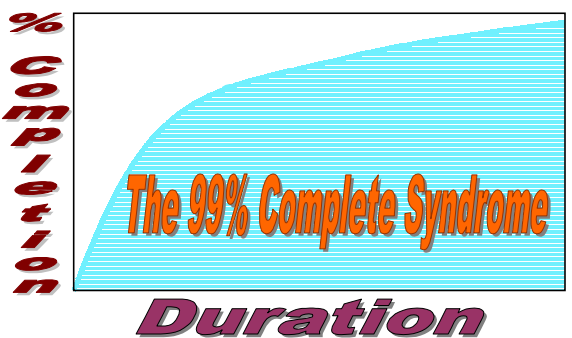


Monitoring and Control

Information

- Collection and collation
- Analysis
- Reporting


Control



Duration

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Project control – The aims of project control are to ensure that the project provides a system which meets its original objectives. Overall control is by higher management in relation to business objectives; day to day control is with the project manager. The purpose of control is to run the project as far as possible according to the plan and schedule. When deviations occur the control actions are limited:

- Adjustment in the use of resources, e.g. personnel, overtime, machine time.
- Detailed rescheduling of the project.
- Re-planning (which implies not meeting the project objectives).
- Cancelling the project.

Before control can be applied, it is necessary to have accurate information on which to base the control decisions. This information needs to be collected, compiled into a form in which it can be analysed, and then analysed. This will then lead to report generation, showing the status of the task or project at a specific point in time, with recommended recovery actions if necessary.

Many IS (and other) professionals will recognise the 99% complete syndrome, where the last 1% of the work seems to occupy 50% of the time needed! This is normally due to a complete absence of real data by which to measure real progress. We need to avoid this, and be able to show accurately the status of the task.



Information Collation

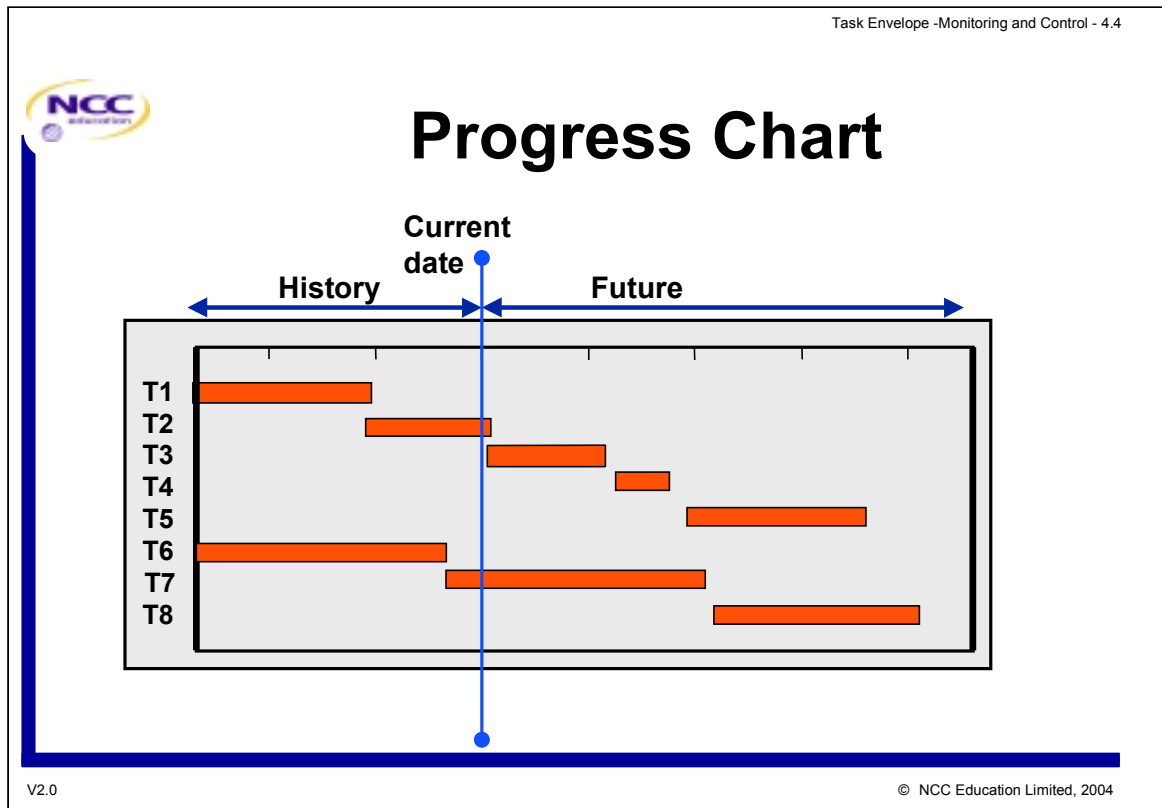
Task no.	Desc.	Planned start	Planned finish	Actual start	Actual finish	Exp' duration
14	Design layout	12 Jul	12 Aug			
18	Prepare budget	5 Aug	12 Aug			
25	Book space	12 Aug	10 Sep			

Gathering the information on which to base a decision can be the most difficult task of the manager. Often, measurement information is not collected that would answer the questions that you need to ask, and it is therefore necessary to design forms specifically for your purpose and get them completed on a regular basis. The forms should be kept simple, and only request the information that is needed.

Collecting duration information, as shown on the visual, is of limited use if you need information on how much resource has been used and how much progress has been made.

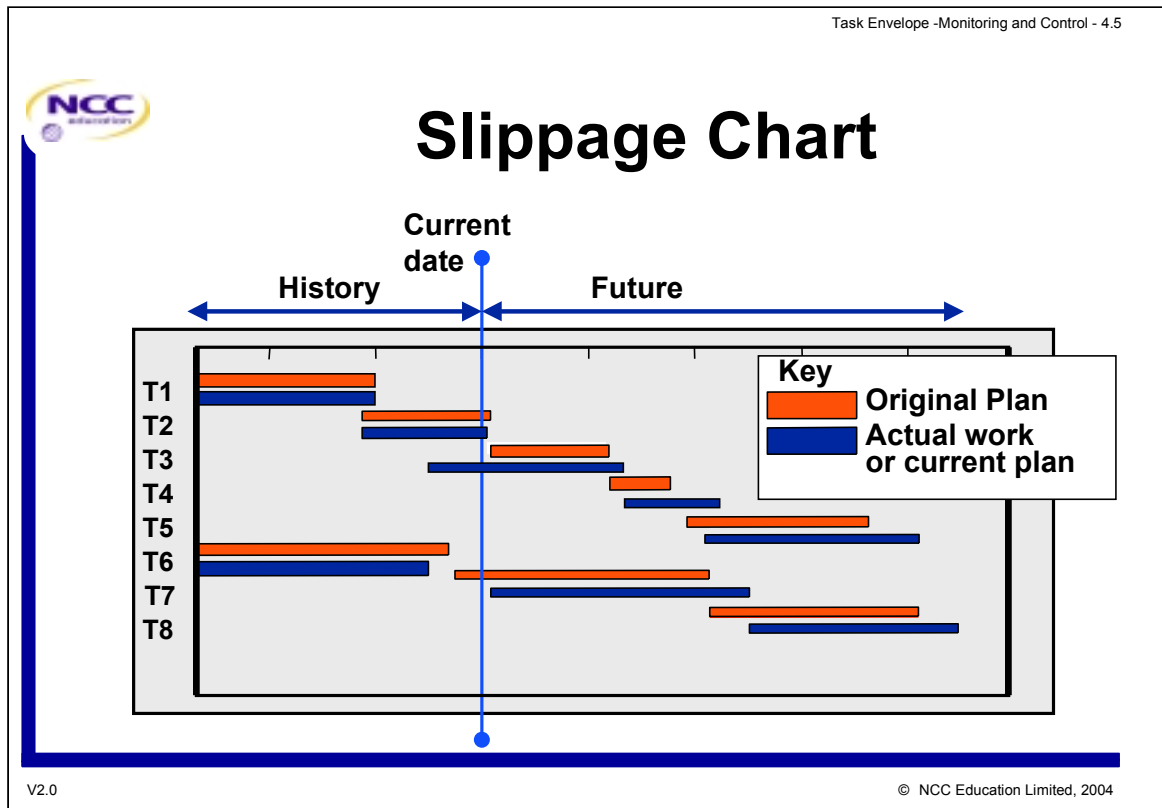
Be aware that the human mind is optimistic when measuring how far a task has progressed – even more optimistic than it was in estimating the duration in the first place!

Also, the percentage complete always begins at zero. As time rolls by and the work gets done, this estimate rapidly increases. It generally increases more rapidly than the work itself. Soon, the team realise that they cannot go back. Reporting a figure less than last week's would show negative progress. Thus begins a lengthy period when the percentage completed figure is close to, and even approaches, but never actually reaches 100%. This is referred to as the 99% complete syndrome.



Many people make the assumption that because for 5 days, people have been working on their tasks, 5 days' work must have been done. This is extremely dangerous. Did the people really do 5 days' work? Was it useful work, and was it spent on the right tasks? Just because eight architects have been working away on the design of a new office block, does not mean that they have done much useful work. They might have been painting the drawing office, or working on another building, or they may have had to throw away the work they had done and start again. Frequently time is spent overcoming obstacles or finishing other projects and tasks.

It is also important to remember that, although information is needed to understand the history (what has happened so far), it is not possible to change the history. One only has the capacity to change the future. So a simple chart, as shown in the visual, indicating tasks completed and those still to be started based around the current date, is a useful starting point in any monitoring process. This is shown on the original plan for the project and indicates, in reality, what *should* have been done, and what is yet to be done. There is a temptation to amend the original plan, but in doing so, you are likely to lose information that will be needed in your project closure report or your post implementation review.



It is more useful, therefore, to freeze the original plan, and show the actual work performed and the current plan super-imposed on top of the original plan.

This shows a scenario where T6 was completed early, and instead of starting T7, the team decided to start T3 early. For whatever reason (it could be that T3 has turned out more complex than originally thought, or that a lot of rework is needed due to the dependency on T2, and T2 is not yet complete) the current plan shows that T3 will slip. Also, because the resources are being elsewhere employed, it is not possible to start T7 until T2 is complete; T7 and T8 will also slip.

Normally the team would get a copy of the new barchart to enable them to predict when their involvement will be required. It is a fact of life that projects are delayed, and this in itself need not be due to bad management. It is, however, bad management not to know how much the project has been delayed and what the effects are.

Identifying projects early allows problems to become visible and to be solved, especially when the problems are not of your making.



Cost Monitoring

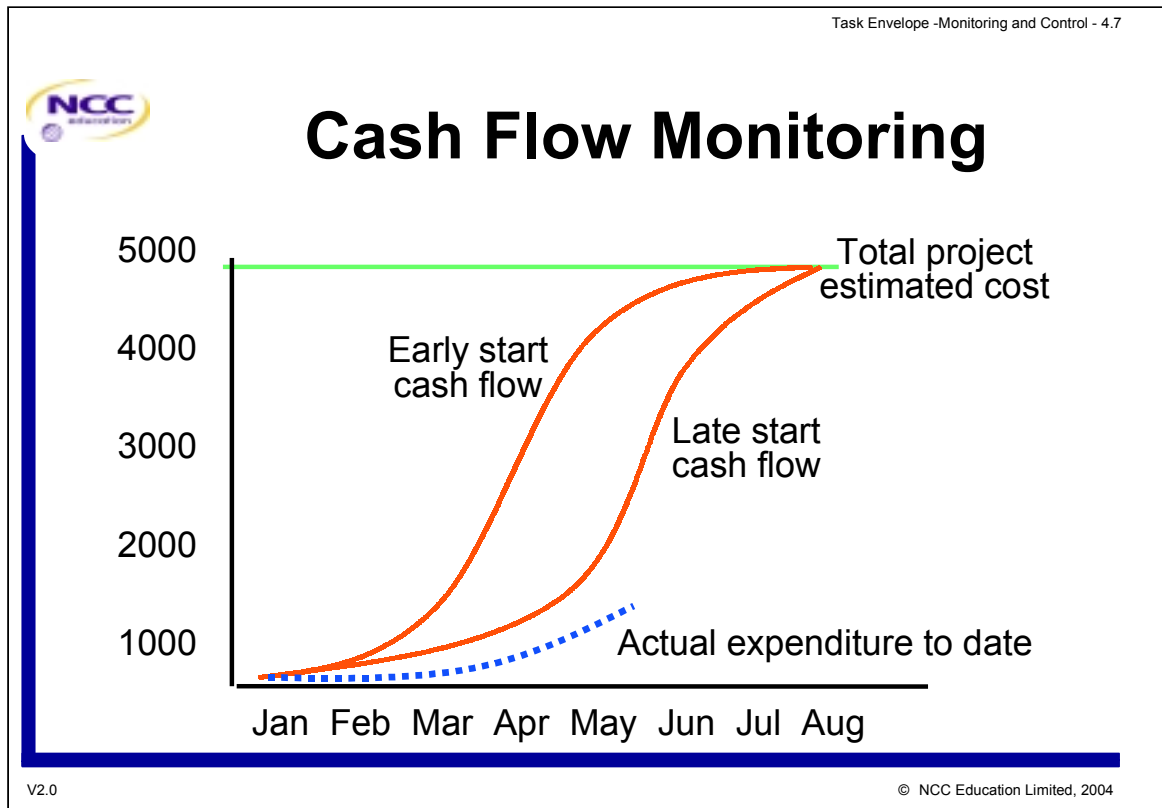
Variance = original budget - (actual cost + cost to complete)

or

Variance = $\frac{\text{original budget} - (\text{actual cost} + \text{cost to complete}) * 100}{\text{original budget}}$

It is also necessary to track expenditure against budget. This is often performed by way of calculating the difference (variance) between the original allocated budget for the task and the current predicted total cost of the task. An element of this current predicted cost must be the actual cost so far. The nearer you are to completion therefore, the more accurate your variance figure will be.

It is either expressed as an absolute value, or as a percentage.



An effective way of monitoring cash, might be to plot the actual expenditure against the expected expenditure if the project began as early as possible, or as late as possible (early start and late start). This will indicate whether your cash flow is on target – or whether you have a problem that needs investigation. In any case, there is a significant amount of interpretation required.

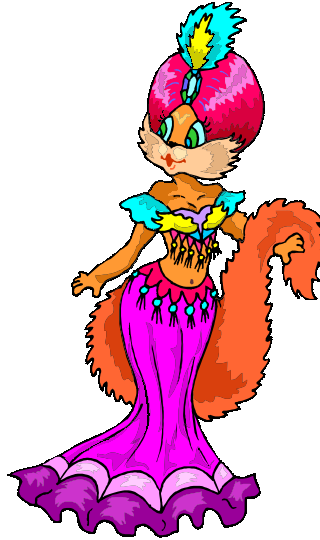
- Study the graph on the visual. It shows an underspend. *Is this good or bad news?*

Perhaps the project manager has found a cheaper way of doing the tasks? Maybe the project is way behind schedule, not enough work has been done so far, and therefore you can expect to finish miles behind schedule – it is either better or worse but we don't know which. On its own therefore, the graph is of little value. It needs to be studied alongside additional information.

- *What information might this be?*



Earned Value Analysis (EVA)



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At first glance, EVA seems to be a very simple and effective way of monitoring progress and cost. It suggests that you compare the value of the physical work that you have done with the value of the work that you should have done.

You measure the actual amount of work that has been done at a given date and multiply those amounts by the value – the cost rates used to produce the budget. You do not need to know how much has been spent, just the amount of work done and the value of that work. You can do this for each task and for the total group of tasks, and also total all the tasks for a project overview.

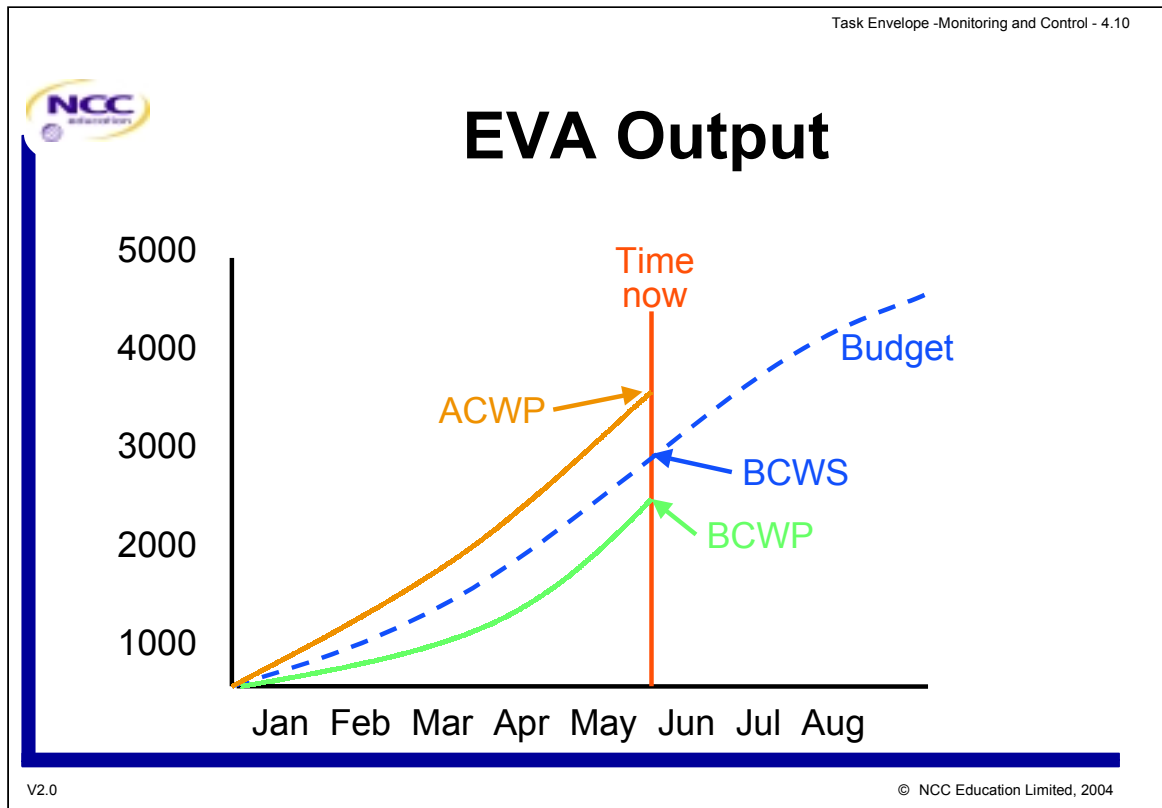


EVA Terms - 1

- **BCWS** (*budgeted cost of work scheduled*)
- **BCWP** (*budgeted cost for work performed*)
- **ACWP** (*actual cost for work performed*)

Here are some simple explanations of the factors and ratios used in EVA. A software tool is usually used to calculate the numbers once all the planning and progress data has been collated and input.

- **BCWS (Budgeted Cost of Work Scheduled)**
 - This is the value of the work you should have done at a given point in time. It takes the work planned to have been done and the budget for each task, telling you what portion of the budget you planned to have used.
- **BCWP (Budgeted Cost for Work Performed)**
 - This is the value of the work you have done at a point in time. It takes the work that has been done and the budget for each task, telling you what portion of the budget you ought to have used to achieve that.
- **ACWP (Actual Cost for Work Performed)**
 - This is the actual cost of the work done.



This visual demonstrates a typical graph showing the three primary EVA monitoring values. It shows a project which is currently behind schedule and overrunning costs.

This looks simple, but providing a graph of this clarity in a typical Information Systems Project can be fraught with difficulties.

It assumes that there is a simple measure of size of the task in hand, and that it can be linearly pro-rated from the start to the end of the project.



EVA Terms - 2

- **SVAR (*schedule variance*)**
- **CVAR (*cost variance*)**
- **EC (*estimated cost at completion*)**
- **BC (*budget at completion*)**
- **EVAC (*estimated value at completion*)**

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More EVA terms:

- **SVAR (*schedule variance*)**
 - This is the value of the work you have done minus the value of the work you should have done ($BCWP - BCWS$)
- **CVAR (*cost variance*)**
 - This is the budgeted cost of work done to date minus the actual cost of work done to date ($BCWP - ACWP$). A negative CVAR shows the current budget overrun.
- **EC (*estimated cost at completion*)**
 - This is a revised prediction of how much the project will cost (taking into account what you have actually spent so far, and your current estimate to complete the remaining portion of work)
- **BC (*budget at completion*)**
 - This is the original budget for the whole project.
- **EVAC (*estimated value at completion*)**
 - This is the difference between your original budget and your latest revised budget ($BC - EC$). A negative figure would indicate an anticipated cost overrun.



EVA in Information Systems

- In what sort of IS projects can EVA be easily utilised?
- Could you use it for your IS project?
 - If not, why not?
- What additional information would you need?
- Where would it come from?

One of the major problems confronting the IS professional when monitoring progress, is assigning a number to indicate the size of the work required. It is easy to say that 80% of the allocated budget has been spent on the effort to perform the task – but not so easy to say that the task is 80% complete.

How might these problems be overcome?



Techniques for Identifying Potential Problems

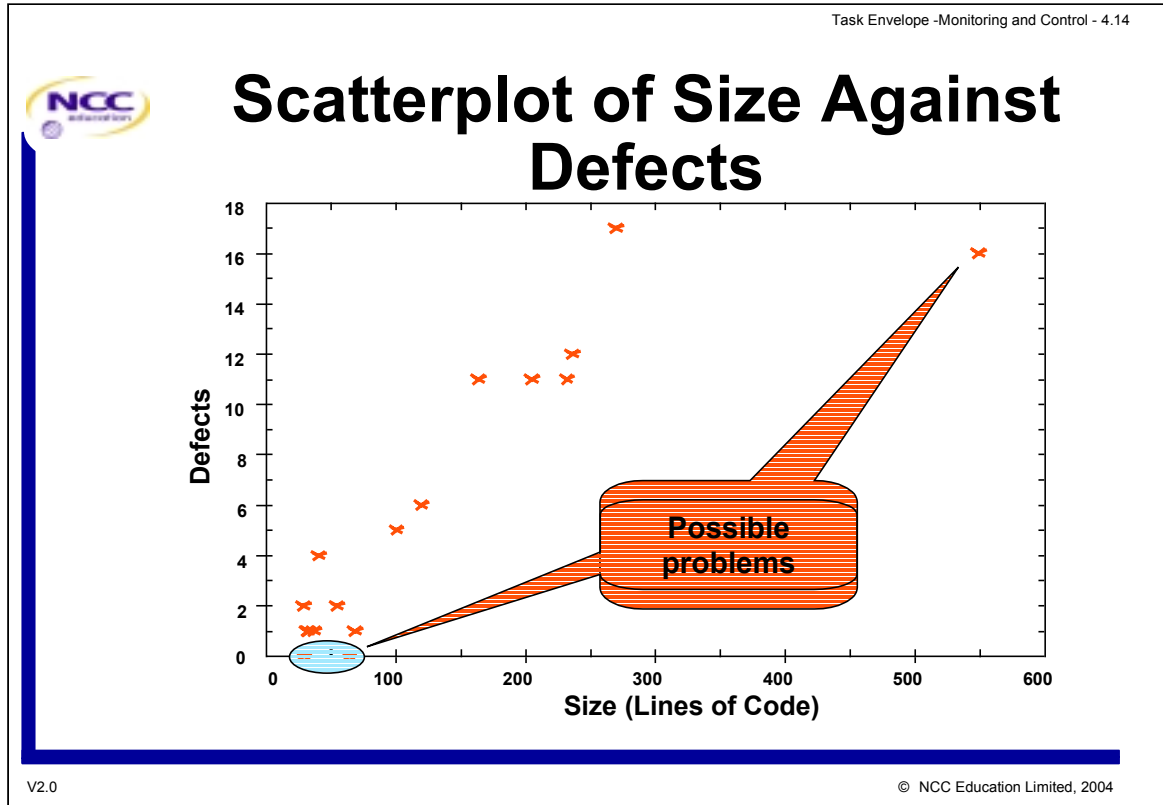
- **Phase-based monitoring**
 - monitoring against plans
- **Anomaly detection**
 - modules/documents with unusual characteristics
 - use scatterplots and quality control charts
- **Trend analysis**
 - plot characteristics over time
 - look for unexpected patterns

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Having looked at *duration* and *cost* based progress monitoring, here are some additional techniques that are often used in an Information Systems context.

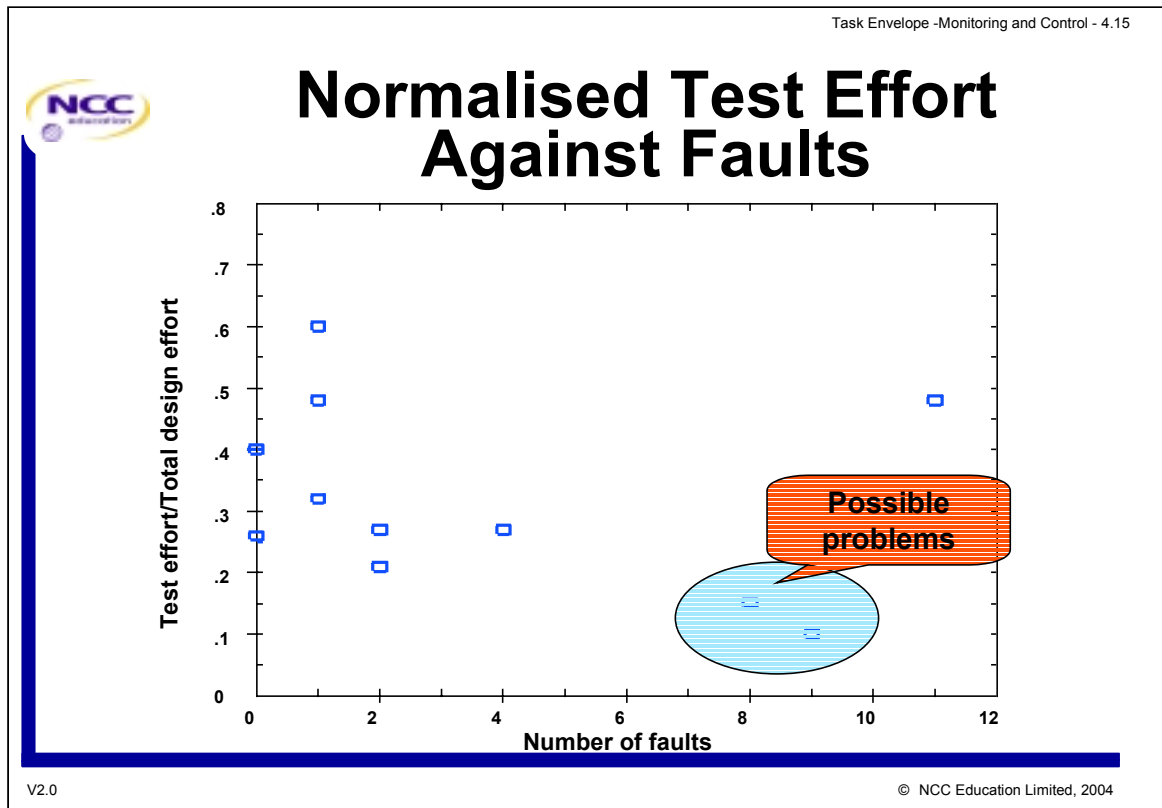
- Phase-based monitoring monitors actual values of project or product attributes against those expected at key points in the task life cycle. It consists of looking at the status of the project at suitable points during the development. It is based on assessing the values of appropriate attributes (effort, duration, problem rates etc.) to establish if progress is satisfactory. Phase-based monitoring assumes that quantifiable targets (i.e. plans) are established for all tasks and outputs associated with each stage in the process. Monitoring involves checking the adherence or otherwise of the development process and products against those targets.
- Anomaly detection is usually performed at phase-end when objects handled in a phase are in a comparable state. It involves investigating whether any objects have unusual or potentially dangerous characteristics. Anomalous objects are likely to require management consideration and possible corrective action, if the project is to meet its goals. Anomaly detection identifies product components that have *unusual* characteristics on the grounds that anything out of the ordinary may present a threat to a project or product. For example, a component with an unusually large number of known defects logged against it, might pose the threat of poor product reliability due to residual defects.
- Trend analysis looks for patterns over time that are inconsistent with plans.



Another means of identifying unusual components is to use scatterplots. These allow you to consider two characteristics at the same time, for example, component size and defect or problem counts. Components that are different (visually isolated) from the rest may be indicators of problems. For example, a large component with a low defect count may not have been sufficiently tested.

This visual shows a typical scatterplot relating component size to number of defects (errors). It is usual to observe that size is positively related to number of defects but there will probably be several components with unusual combinations of values.

In this scatterplot there is one large program which has relatively few faults for its size. It could be a badly tested component – many of the possible functions have not been tested, and still contain many undetected defects.



This scatterplot shows the ratio of component testing effort to total development effort plotted against the number of faults found in testing. The ratio is used in an attempt to normalise the effort value that will clearly vary with the size and complexity of the component.

Components with a low test effort ratio and a high number of faults are problem modules. They needed to be reviewed to identify whether the best strategy for dealing with them is more intensive testing or re-design.



Trend Analysis

- **Time Based**
 - monitor individual objects over time
 - assess deviation from expected trends
- **Intercheckpoint Monitoring**
 - build up of partial products towards a checkpoint
 - inspections performed to date
 - cumulative modules through design, code, unit test
 - system test runs per week

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There are two methods of trend analysis:

- time-based monitoring;
- intercheckpoint monitoring.

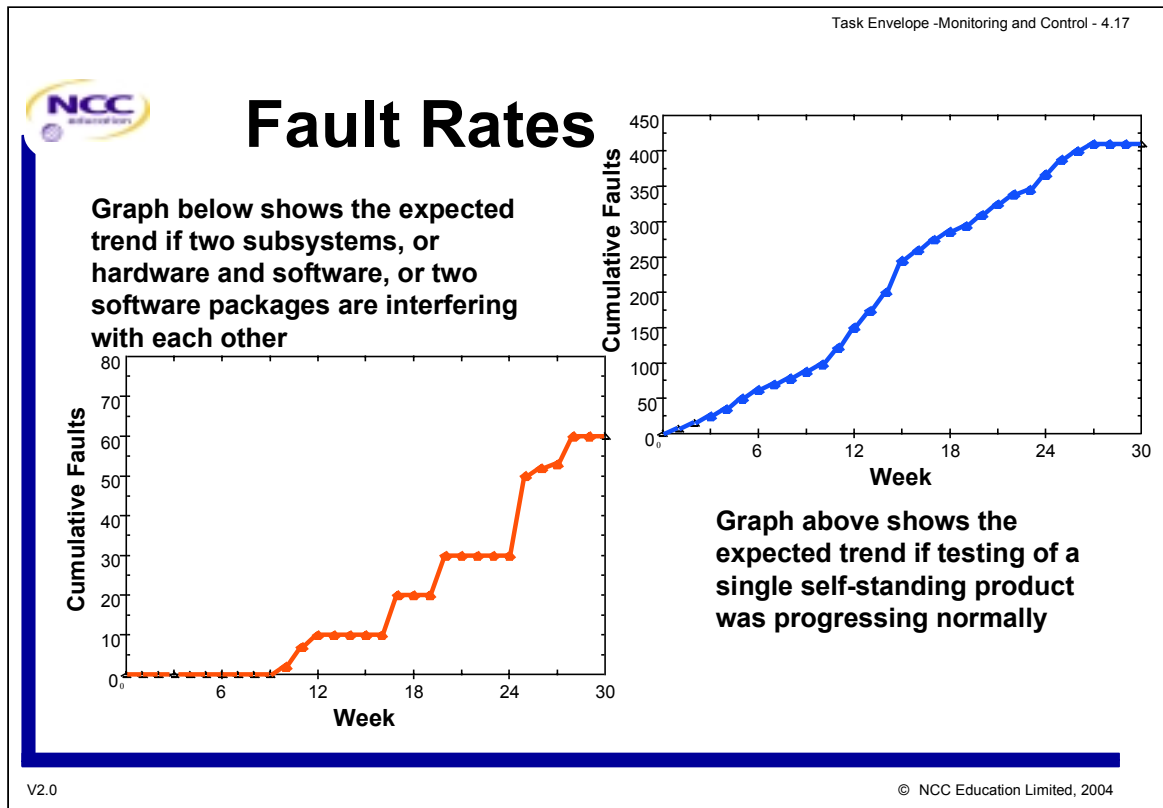
These forms of monitoring are particularly important if there are long periods of time or large expenditure of effort between checkpoints or milestones in a project.

Time-based monitoring is the process of monitoring the behaviour of an individual object over time. The aim of the technique is to detect deviations from an expected trend. An example of this is deviation of the reliability growth of a system from that predicted by a reliability growth model.

Intercheckpoint monitoring is the process of monitoring the inter-phase status of the project by observation of build-up of activities and intermediate products towards a checkpoint. This allows continual monitoring for abnormal situations.

An example of this is to monitor the size or complexity of components entering integration. It is useful to check that there is no systematic trend to early completion of small, simple components, leaving only limited time for testing more complex ones. Other measures to monitor could be:

- the cumulative number of inspections performed to date;
- the cumulative modules through design, code, unit test;
- the cumulative number of system tests run per week.



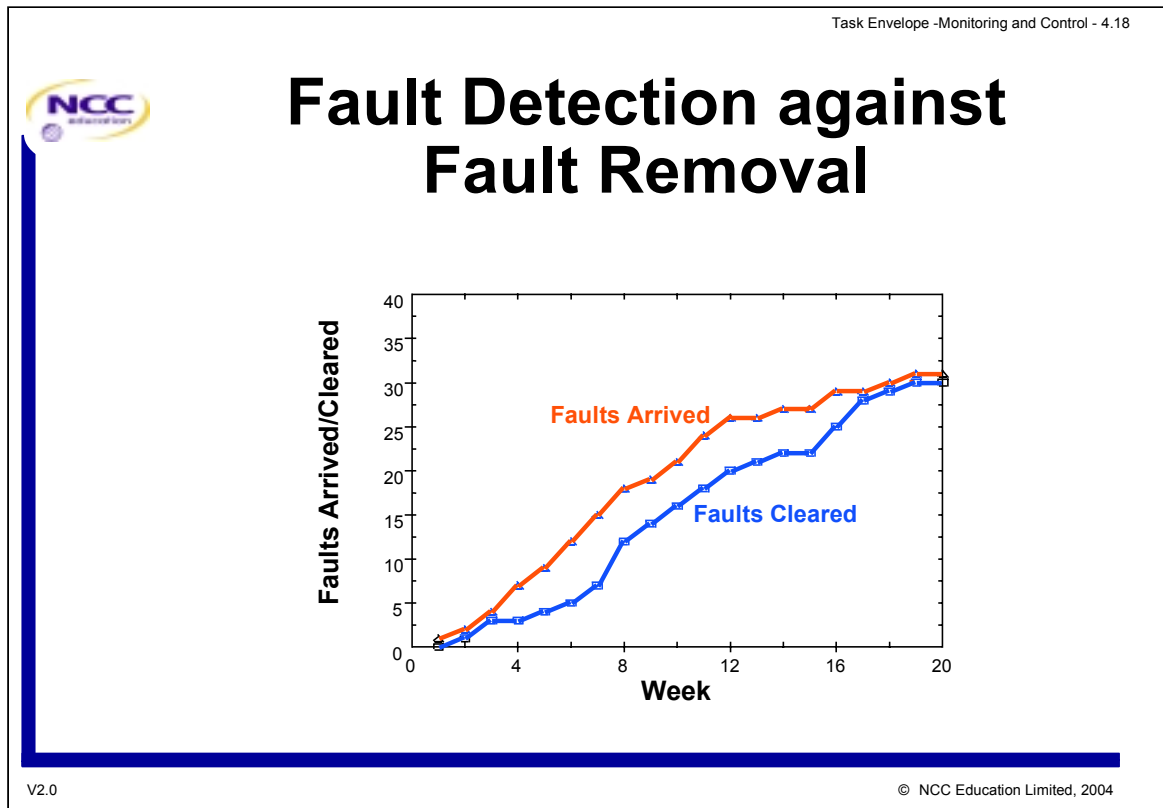
Anomaly detection and trend analysis can be used to identify potential problems in a number of different domains including personnel and process issues, not just product quality. For example, if an area of concern is personnel shortfalls then you might decide to monitor staff turnover by skill categories, or if you were concerned about effort and timescale delays then you could monitor testing and debugging progress per week for defects detected and cleared or tests successfully completed.

This visual gives two examples of simple plots that can be used to identify potential problems.

Monitoring of progress is interpreted in terms of our expectations and plans. Both graphs show the number of observed faults against time as recorded as part of system test. The blue line (graph on the right) shows an example of the trend that would be expected if testing of a single self-standing product was progressing normally.

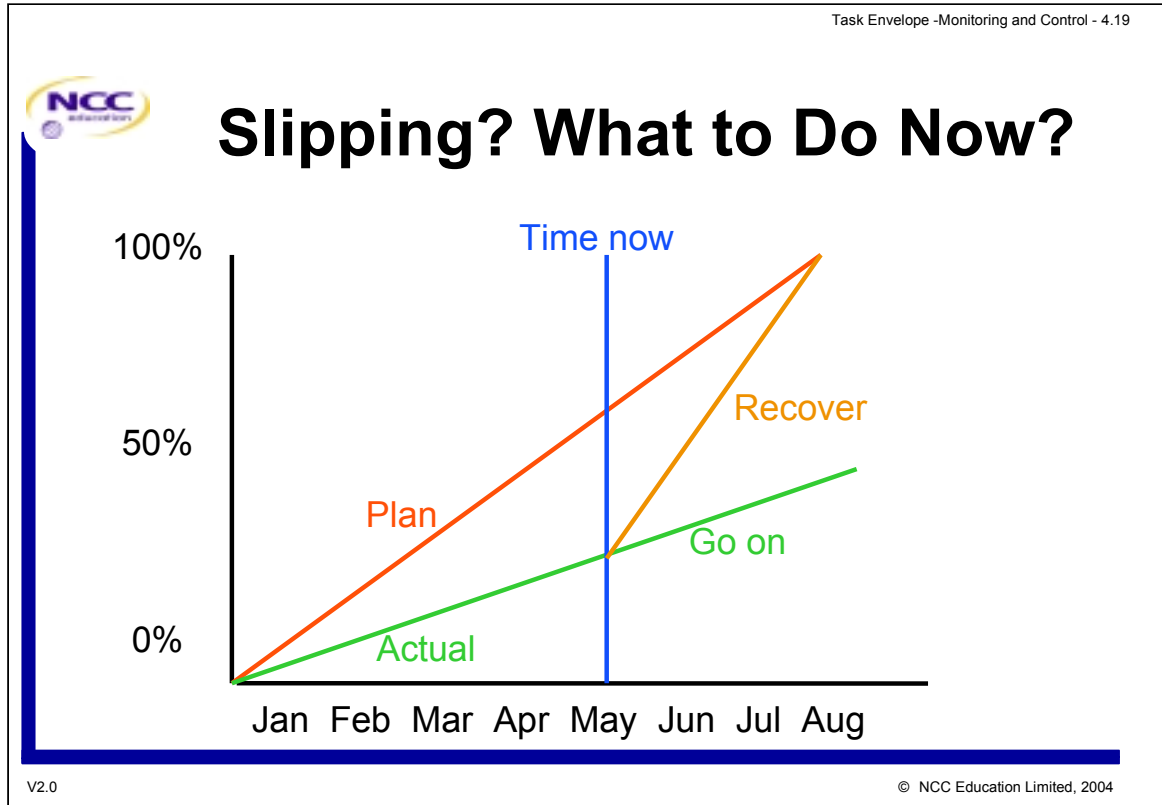
The red line (graph on the left) demonstrates the type of plot obtained if two subsystems, or hardware and software, or even two software packages are interfering with each other. This trend arises because faults in one subsystem delay progress in the other.

Both graphs could represent an acceptable trend, provided that the trend is expected. If the actual trend shown by the red line was not expected, the project would be likely to suffer extended timescales or increased effort.



This visual shows another example of how trend analysis may be used.

For example, if *defects found* and *defects cleared* are both plotted against time and the number of defects cleared is not increasing at the same rate as defects are found, there is a danger that backlogs of defects will cause a schedule overrun.

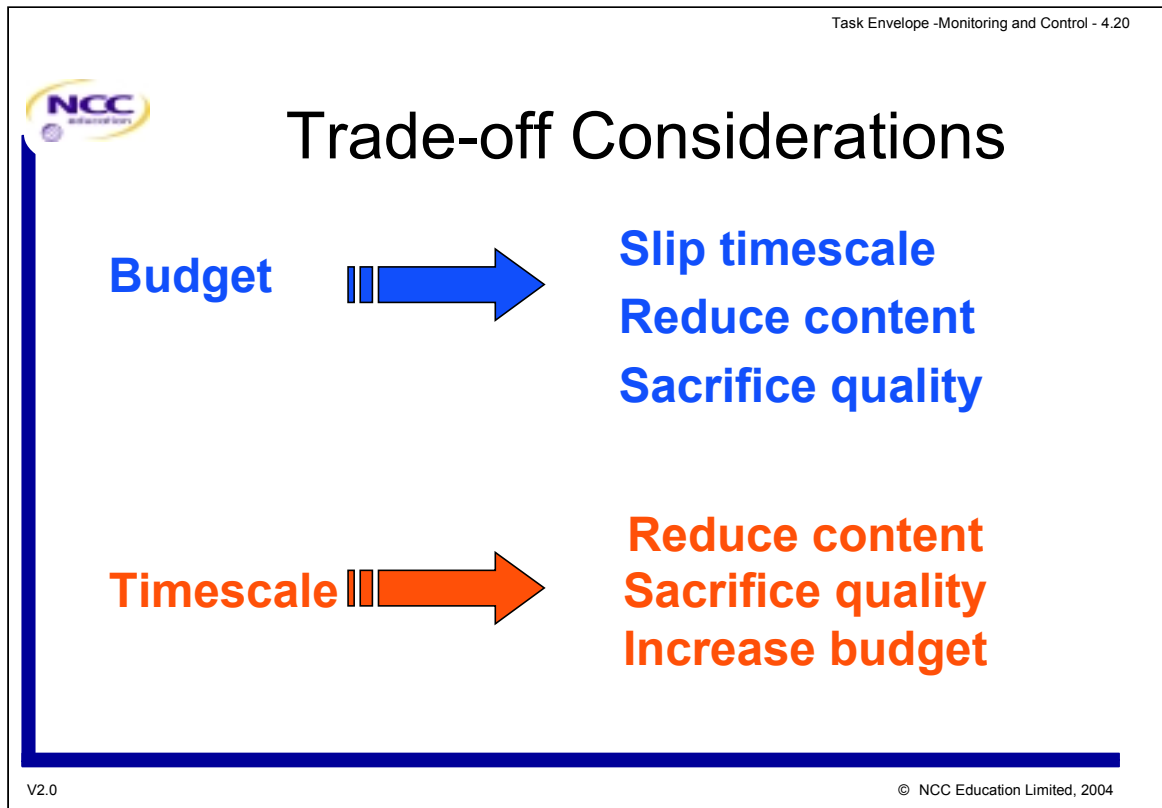


This visual shows a project or task which is slipping, and a decision needs to be taken on how to proceed.

The options are:

- Improve productivity to ensure recovery to meet original delivery schedule.
- Carry on with current productivity levels, and agree a later delivery date.
- Carry on with current productivity levels, and agree to deliver less than that which has been agreed – either on a temporary basis, or a permanent contract reduction.
- Stop the project, and cut the losses.

What are the cost and resourcing implications likely to be of each of the above options?



When problems occur, recovery actions need to be taken. Almost certainly this will involve some trade-off. The question is what is appropriate and acceptable from both supplier and customer viewpoints.

If the budget is the critical parameter then either the timescale must slip or the project work content must be reduced.

If timescale is the critical parameter then either budget must be increased or work content reduced. Trying to compress the timescale for the same work content leads to a disproportionate increase in costs.

Both of the above scenarios imply pressure on the project team and the first casualty in these cases is often product quality. It is possible to make a conscious trade off of quality with critical timescales by reducing the amount of testing to be performed. The implication of this is that life time costs of effort and cost increase disproportionately, due to the high cost of fixing problems as we move into field use.



Action Pitfalls

- Plans become out of date
- Problems will go away
- We can make up slippage later
- Everybody will work overtime
- Get extra staff in
- Manage the plan not the job
- Keep it unobtrusive

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Project plans are forecasts of the future and may well require frequent change. One of the worst mistakes a project manager can make is to continue to use a project plan that is no longer applicable. It is important to recognise problems as soon as possible and take action to overcome them. Neglected problems only grow bigger. It is often tempting to assume, particularly in the early days of a project that it will be possible to make up time later on. This hardly ever happens. Slippage in the schedule usually implies underestimating complexity or overestimating productivity, or both.

In order to retrieve a timescale overrun situation, it may be possible to introduce overtime working although there are limits to this. Additional manpower resources can occasionally be introduced into project teams, but it must be done early, or Brook's law will come into effect, "*a late project will become later still by adding manpower*". The main reason for Brook's law is that the new schedule must allow for training and familiarisation and when this is done the new schedule may well look worse than the original.

It is more likely that at review time, escalation of costs will result in a watering down of the proposed system to keep within budgeted development costs. The danger is that too many of the potential benefits are whittled away so that the system that is finally introduced no longer delivers benefit, just a cost in perpetuity. The worst form of action.

Project management should be kept unobtrusive but ensure that relevant up to date information is collected.



Summary


- **Regular monitoring and review is essential**
- **Appropriate measurement is crucial**
- **Measure product and process - not people!**



So, to summarise, regular monitoring and review is essential to success of task or project. Do not hide your head in the sand!

Appropriate measurement is crucial. Ensure that effort is not wasted collecting information and data that is not needed for the purposes of your project or task.

Measure product and process – not people! Or the people will retaliate!



**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 5
Task Envelope - Supporting
Disciplines**

Task Envelope - Supporting Disciplines - 5.1

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This session introduces five areas briefly.

The objective of this session is to ensure that the students are aware of the totality of issues surrounding complex IS projects.



What Supports an IS Task?

- **Documentation**
- **Configuration management**
- **Verification and validation processes**
- **Quality management system and audits**
- **Selection and use of tools**

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These topics may seem to be very software oriented, but the disciplines and skills required for each of them are required whatever the role within an IS environment.

- *Documentation* is required to ensure that everyone has access to information important to their task, and that records of decisions can be kept to enable details to be traced.
- *Configuration management* is required to ensure that when a document or a piece of software is being used, it contains the latest information – and is consistent with information in other documents and/or software.
- *Verification and validation* is necessary to ensure that the product that is delivered is of appropriate quality – it enables constructive critique over work performed in a formal structured environment, so that the product is delivered, or the document issued, with minimum problems.
- *Quality management systems* provide a framework within which all the processes employed can be improved upon, and the audits are necessary to ensure compliance with these processes.
- Whatever tools are used, whether *word processing, control, planning or design tools*, you need to ensure that they *help rather than hinder* the overall manufacturing process that you are trying to create and adhere to.



Documentation

- **What documentation is needed?**
 - and why?
- **When is it created?**
- **Who reviews it?**
 - and how?
- **Who reads it?**



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Take a typical IS development project. The students should identify:

- Management documents – planning and reporting.
- Technical documents – specifications, designs, test reports.
- User documents – operational and user manuals, training materials.

When is it created? – The aim is that the students associate the need for prevention of problems, by not leaving the production of documents until too late in the process.

Who reviews it? – The students should appreciate the need for an independent pair of eyes over their work, regardless of how good they believe it to be.

Who reads it? – The students should appreciate the importance of writing with the reader in mind, and understand the basics of applying readability measures, such as those provided in current word processing tools. A useful maxim is to remember that *words mean what the reader thinks they mean – and this is not necessarily the same as the writer intended them to mean.*



Configuration Management

Configuration management is like accounting - its not an exciting subject unless you ignore it, then your life may get interesting in ways you will neither expect nor enjoy



Have students ever had a project crisis caused by inadequate control of changes and versions of components or documents?

One public domain disaster story is as follows:

- “In 1985 at the Bank of New York, a small, uncontrolled change was made to one of the bank’s online systems. On the morning of the 20th November more than 32,000 transactions were waiting to be processed. The software began to corrupt these and the bank lost control. The Federal Reserve continued to deliver securities until the Bank of New York was \$2 billion overdrawn. It was finally fixed, but \$5 million was lost in interest on the loans to cover the problem.”



How Do I

- Know what I'm looking at?
- Know where to find it?
- Know it's the latest copy?
- Know who's responsible for it?
- Know who needs to know if changes are made?
- Make a change to it?
-?



For any item (document or component within an IS environment – be it software or hardware related), it should be possible to answer each of the questions posed in the visual. If it is not possible, then it is likely that the organisation has insufficient control over the items that are bought or created within it.



Principles of Configuration Management

Configuration management is

- **Configuration identification**
- **Configuration control**
- **Configuration status accounting**
- **Configuration auditing**

Configuration Management comprises four primary disciplines:

- *Configuration identification* – Knowing what items are under configuration control and how to identify them.
- *Configuration control* – How to handle Change Requests, deal with emergency situations, how to build releases of correct versions of components and control variants.
- *Status accounting* – Tracking the items and managing transitions between one status and another.
- *Auditing* – Proving it is being done properly.



Configuration Identification

- Development item
- Configuration item
- Item dependencies



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- Development item
 - An item of software or documentation which is not under change control, and can be changed by the developer as much as is required without authorisation or notification. These items still need to be identified both electronically and as soon as they are created on paper, so the creator or developer can easily access them. Under these circumstances, the items have not been copied and issued to anyone else for any reason whatsoever.
- Configuration item
 - As soon as an item is copied and distributed to others, then it becomes a configuration item – and is subject to change control and identification through a series of version numbers. One copy of the item may return to the developer and become the development item again if changes are requested.
- Item dependencies
 - Relationships between items need to be identified and maintained – not only the relationship between a single item and its derivations, but between different items that form part of the same overall product. This is why determination of a naming convention and storage system is important early on in a new development.



Configuration Control

- **Change control process**
 - change requests
 - emergency updates
- **Release control**
- **Variant handling**



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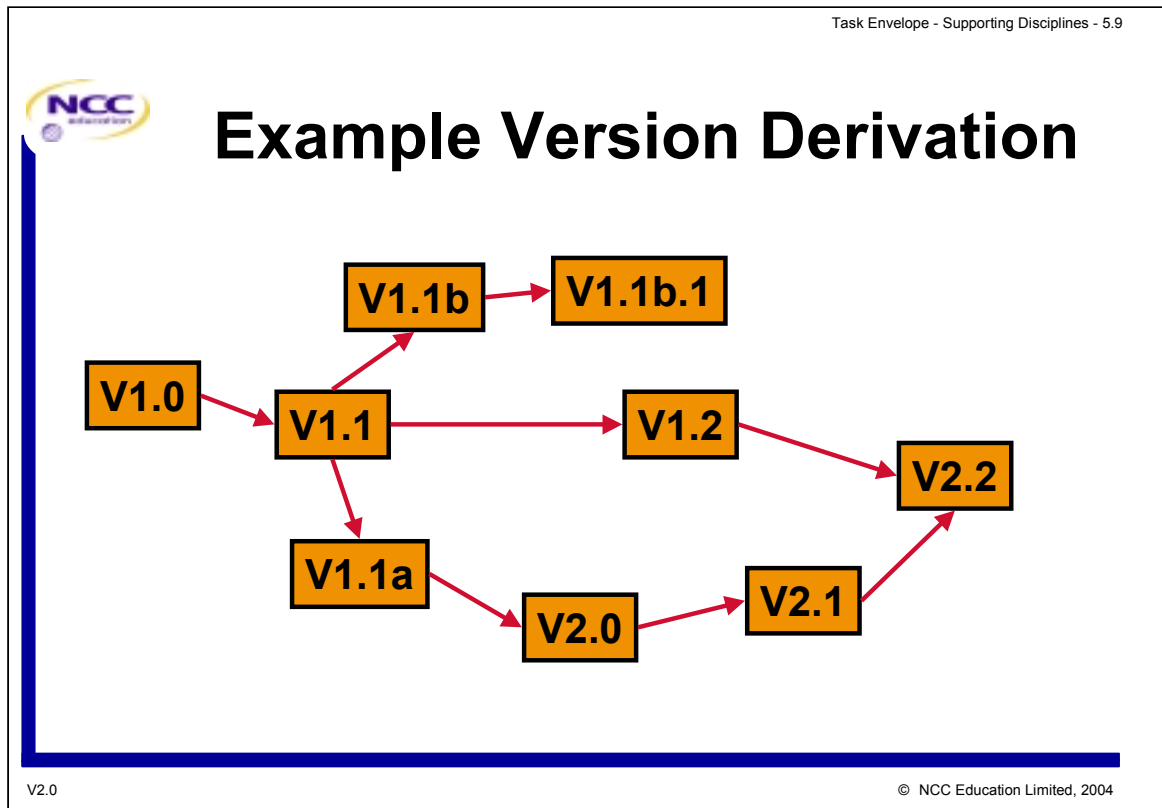
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It is often necessary to have detailed procedures that can be followed to enable changes in a normal non-crisis situation, as well as temporary changes that can be made if a crisis situation looms and no time can be *wasted* awaiting the normal channels of authorisation. Such emergency changes must only be undertaken as part of a risk assessment and reduction process, which itself is fully documented.

Where are changes initiated and why? The usual reasons are because the requirements change, or because errors are made in development.

Variants occur when one item exists and is required to remain in existence and a variation of that item is required for some other purpose or client. Controlling these variants, and especially changes to them – particularly when they have the common electronic source – can prove a difficult intellectual challenge.

- Have any of the students encountered this problem?
- If so, how was it resolved?



This visual shows an example of how complex version numbering can become – especially if variants become necessary (as indicated by V1.1a and V1.1b). A defined numbering scheme is essential, and it is recommended to keep it as simple as possible.

It is essential that control over the version numbering is retained long after the item has been handed over to the user, otherwise, all the controls that were in place during development will be wasted.

From a development and maintenance point of view, it is better (less confusing) to restrict your support to a single version, but you may have a problem if your users are reluctant to upgrade, and it is often necessary to compromise, in order to keep your user community satisfied with your service levels.



Status Accounting and Auditing

- **Tracking the state of configuration items**
- **Like financial auditors, you need audit trails**



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As a product is being compiled of its many components – maybe a software product made up of software modules, or a document made up of individual chapters or sections, it is necessary to keep records of the progress, and the change requests are included in the product. This enables easy traceability of components, should any require further change, and also of change requests if it is necessary to determine whether they are included or not.

Like financial accounts, configurations that are being worked on and delivered to clients and users should be audited to ensure that the process has been carried out effectively. Configuration management processes are the easiest to audit in a software environment, and it can be quickly ascertained whether a team is in control of their product or not.

To initiate an audit using configuration management techniques, there are basically two simple approaches:

Either:

- Select a problem report or a change request and follow it through from the beginning of the life cycle, tracing its implementation.

Or

- You can take a finished product, select a component at random, and trace its development through various change requests and versions, to the original specification.



Verification and Validation (V&V)

Verification

- Internal consistency and completeness
(*Are we building the product right?*)

Validation

- Correctness with respect to requirement
(*Are we building the right product?*)

Verification and Validation (V&V) are the processes applied to ensure that quality is built in to each and every component and product at the appropriate point in its development.

The definitions in the visual attempt to clarify the terms that are often abused within the IS industry.

Verification is the process of comparing the output of a task against the input of a task, and checking for internal consistency and completeness.

Validation compares the output of a task with the users' statement of requirements to ensure that the work just completed is consistent with the users' needs.

The phrase Verification, Validation and Testing (V,V&T) is often used in Information Systems quarters. In actual fact, testing is just one of the techniques that can be used to undertake either V or V. So it is more accurate to refer to this as V&V. This also removes the emphasis from software, as it is important that V&V are applied to other products such as documentation, reports and presentations as well as software.



V&V on Documents

Fagan inspection

- Detailed and inviolable starting and ending rules
- Supported by measurement and analysis
- Rules and methods evolve to suit each organisation

Fagan Inspection is a technique that was developed by Michael Fagan at IBM during the 1980s. It enables effective fault removal throughout the life cycle, and can be used on any component that can be *read* and studied by a person.

Fagan's claim that documents are only formally complete after V&V is carried out, provides a basis for sound product control, and lowers the risks associated with failure to comply with *user requirements*.



Fagan Inspections comprise three phases:

- Preparation
 - Administration by nominated moderator.
 - Optional overview by author.
 - Individual study (formal) – work alone for 1-2 hrs.
 - Prepare list of suspected errors which increases meeting productivity.
- Meeting
 - Meetings limited to 2 hours, which is deemed to be the limit of effectiveness; large documents may need several meetings.
 - All inspectors plus moderator attend – usually 3 to 8 people.
 - Document paraphrased by author's peer.
 - Defects are reported and logged as they arise, as the aim of the meeting is to find errors and not correct them; their classification regarding importance and severity is agreed later.
 - A third hour is available if required. This is to enable discussion of potential cures, and to capture the information collected.
- Rework
 - All defects must be repaired:
 - The moderator is personally responsible.
 - Document not released until complete.
 - Moderator can demand re-inspection:
 - Usually because not satisfied with repairs or because of a high level of problems found in initial inspection.



Management of Testing

- **Plans and procedures**
- **Approvals authority**
- **Specialist test team**
- **End of testing agreed in advance**

The management of a software testing function can raise many issues both technical and people oriented.

For testing to be effective, it is necessary to determine the following:

- Plans are prepared as to what is going to be tested, how and by whom.
- Who is going to approve both the test plans and sign off the test results?
- Who is going to do the testing? It can prove beneficial if those testing are completely independent from those who designed and created the components.
- Be clear about the success criteria against which the software is being tested – so you know when to stop testing, and whether you have achieved the criteria or not.



Test Attitude

Test plans are usually made on the unconscious assumption that no errors will be found

- **Underestimated test resources**
- **Late schedule forces omission of 'difficult' tests**



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Although testing is of great importance in the software development life cycle, there is unfortunately a prevailing attitude towards testing that regards it as rather unexciting.

Testing is thought of as a menial task, not like a creative job such as programming. Testing someone else's programme is like cleaning up their mess, and so it is not a popular task.

There are conflicting demands of creativity versus repetitive testing.

General inertia – “we’ve always done it like this” – also has a significant effect on working practices.



Quality Management System (QMS) and Audits

Quality is not an accident - but the result of intelligent effort



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Nowadays, quality is the key to market success. Poor quality leads to considerable rework and maintenance thus reducing the productivity of the developers and, as a consequence, either increasing cost or reducing functionality.

Quality cannot be added on to a low-quality product. Quality concerns must accompany the complete development and maintenance processes. This is performed through establishing an infrastructure of quality oriented techniques and controls that are managed at a high level in the organisation. This infrastructure is called a Quality Management System (QMS). Amongst other things, it will contain all the processes that control all of the topics discussed so far in this session.



Implementing a QMS

- **Obtain management commitment**
- **Develop quality policy**
- **Establish standards and procedures**
- **Introduce internal auditing**
- **Handle deviations**
- **Obtain certification?**

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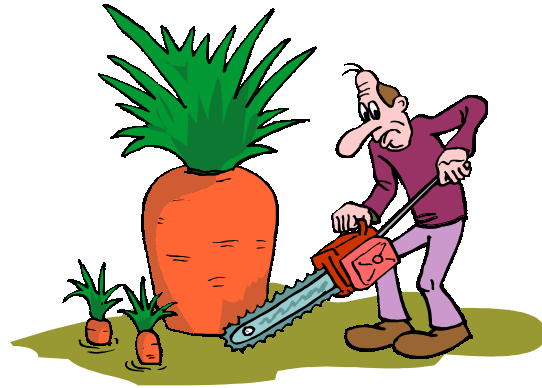
In order to implement a Quality Management System in an organisation that as yet does not have one, it is necessary to undertake the following steps:

- *Obtain management commitment* – Without management commitment, the project will flounder and resources will get reallocated. An implementation project could take upwards of 2 years from start to certification.
- *Develop quality policy* – and *sell* the concepts to the staff. It helps to get everyone on board and willing to co-operate (often easier said than done!)
- *Establish standards and procedures* – Try to standardise on ways of working before documenting them. This will simplify the paperwork enormously. However beware, you could alienate some staff members in doing so.
- *Introduce internal auditing* – Train key staff to undertake audits, and stress that it is the process that is being audited – NOT THE PEOPLE!
- *Handle deviations* – Ensure that mechanisms are in place to track and make changes to the processes, should it be shown by the auditors that they are not functioning as required.
- *If required – obtain certification* – but beware of the “certificate on the wall syndrome”, where once the certificate is obtained, the processes relapse to their former chaotic state.



Audits

**Are your processes
and procedures
working effectively?**



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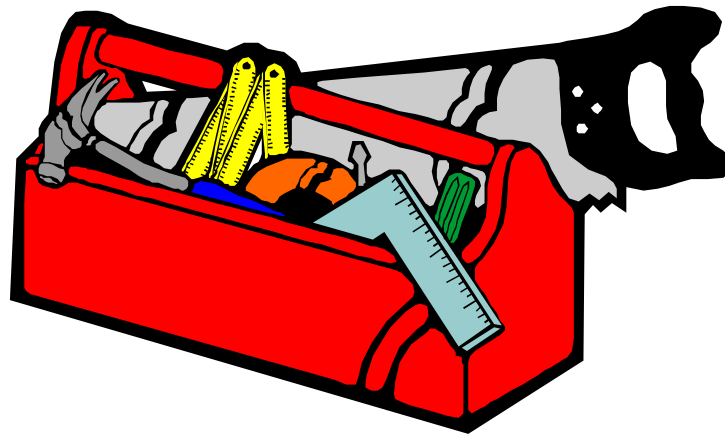
It is not always immediately apparent whether the processes employed are providing the benefits that are expected. Therefore, it is necessary to undertake regular audits on the details of the processes and of the products.

Undertaking an audit requires excellent human communication skills, plus the diligence and determination to get to the bottom of problems. Audits must be planned, undertaken and feedback given without resulting in victimisation problems.

Remember you have to continue to work with your colleagues *after* the audit.



Selection and Use of Tools



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Regardless of whether you need a new word processor, or you need an analysis and design software tool, it is essential that an effective selection process is used. Software tools are not only expensive to purchase, but they can also be expensive in the way of time wasting if they are not exactly suited to your needs, or if inappropriate training in their use is provided.

Many of the processes already covered in this module are supportable by software tools.

- Estimating.
- Planning and progress monitoring.
- Configuration management.
- Software testing.
- Requirements analysis and design.
- Etc.

Establishing an appropriate infrastructure to help make effective use of the available tools can provide an organisation with significant cost savings.



Ensuring Effective Tool Support

- **Evaluate requirements and select candidate tool**
- **Baseline current quality and productivity levels**
- **Select typical project and trial the new tool**
- **Measure new quality and productivity levels**

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One effective but non-trivial procedure that can be applied to assist in the selection and evaluation process is shown in the module:

- *Why might this approach be non-trivial?*
 - Because it relies on a mature programme of collecting and analysing quality and productivity measurements. Very few organisations in the IS industry have the capability to do this, but where it has been performed, good results have been shown.




Supporting Disciplines - Summary

- Documentation
- Configuration management
- Verification and validation
- Quality management system and audits
- Selection and use of tools

To summarise, each of the topics discussed work hand in hand to help ensure that the success criteria are achieved, and the task envelope is maintained.

Task Envelope - Managing Risk - 6.1


**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 6
Task Envelope - Managing
Risk**

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This session discusses some of the principles and techniques that can be applied to improve the probability that a task or project will meet its success criteria (deliver its required products with appropriate quality levels in the required timescales, and at a cost which enables the development organisation to remain competitive).

Any project could overspend or fail one of the other criteria for success due to one or more of the following reasons:

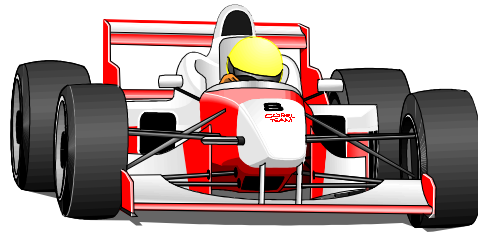
- Failures in planning and design.
- Changes in the circumstances surrounding the project.
- Undertaking a project that was not feasible to begin with.

It is rarely economically viable for an individual task to retain sufficient contingency in the pot to cover all such eventualities. This means that risk needs to be managed at a higher level, ensuring an overview of all the tasks and projects is retained with a pot of contingency that can be allocated across all the projects. It is important therefore to understand the risks associated with each task or project because if all the tasks that an organisation undertook were classed as high risk, then the contingency pot could soon run out.



At Risk

- Potential for injury exists
- Injury not certain



Successful businesses are distinguished by the way they manage risk.

Take no risks and the business will stagnate and die. Take foolhardy risks with no thought of the consequences and the result will just as surely be the destruction of the business. It is common sense to identify the risks to be faced *before* starting major projects or contracts and to adopt the strategies needed to overcome them. This is the essence of risk management.

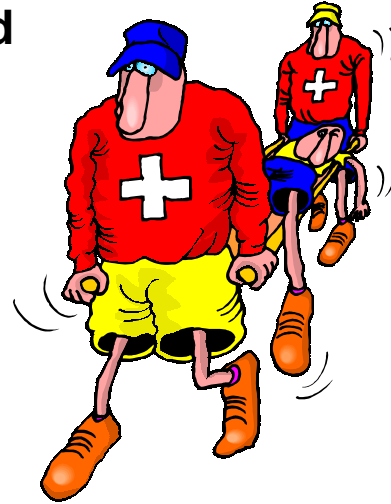
Risk is present in all human activities and is usually regarded in physical terms. It is often seen as health and safety related (for example, both the immediate and long term effects on health of exposure to toxic chemicals) or economic (for example, destruction of equipment and lost production due to fire). The objective of risk management in this context is to control, prevent or reduce loss of life, illness or injury, damage to property and consequential loss and/or harm to the environment.

The concepts and processes of risk management are well established for dealing with risks from the use of a technological product or its interaction with the environment. When dealing with risks to a task or project, however, we are dealing with risks of a different nature.



Problem

- The injury has happened
- No longer a risk
- Probability is 1



It is also important to realise, that when the event actually occurs – when it has become an *issue* (sometimes also referred to as a *hazard*, or a *problem*) it requires action. These actions are often planned as part of the contingency planning process, which itself is part of the management of the risks.

However, once the contingency plan has been activated, the risk no longer exists – and it can be removed from the managed list of risks.

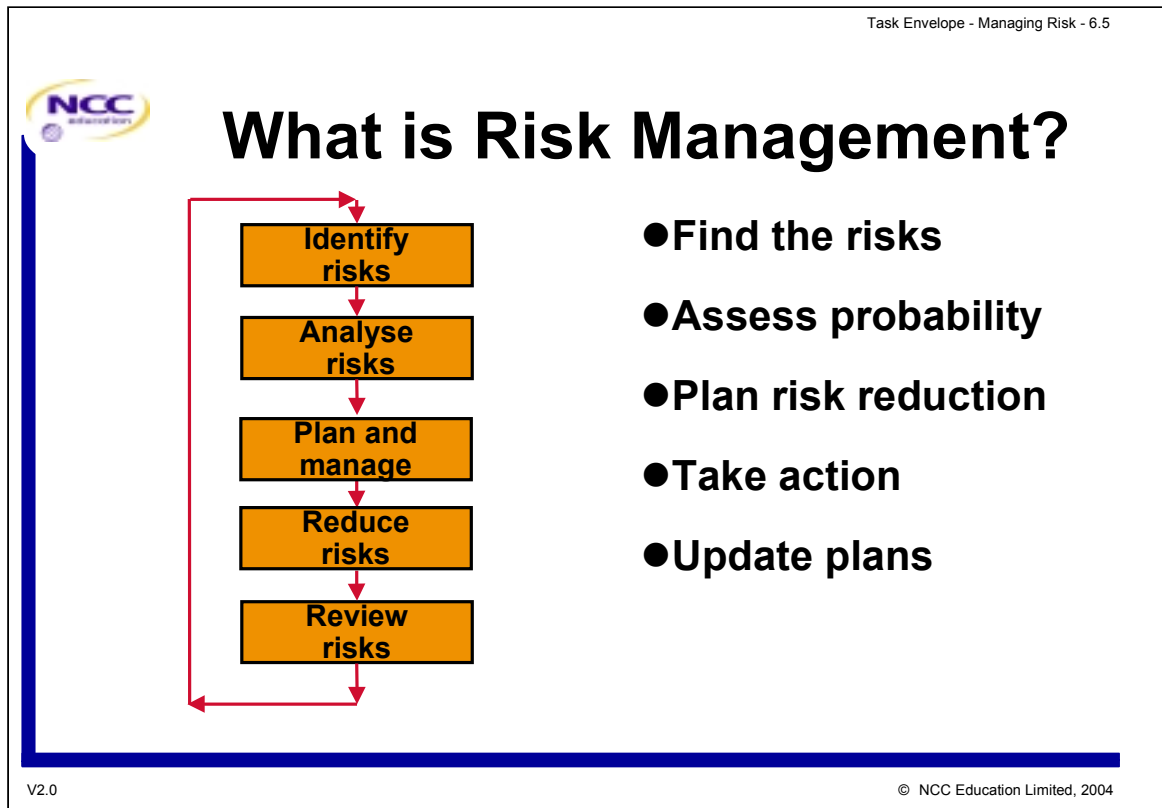


What is Risk?

A combination of the probability of the occurrence of a hazard (event) and the consequence of its occurrence

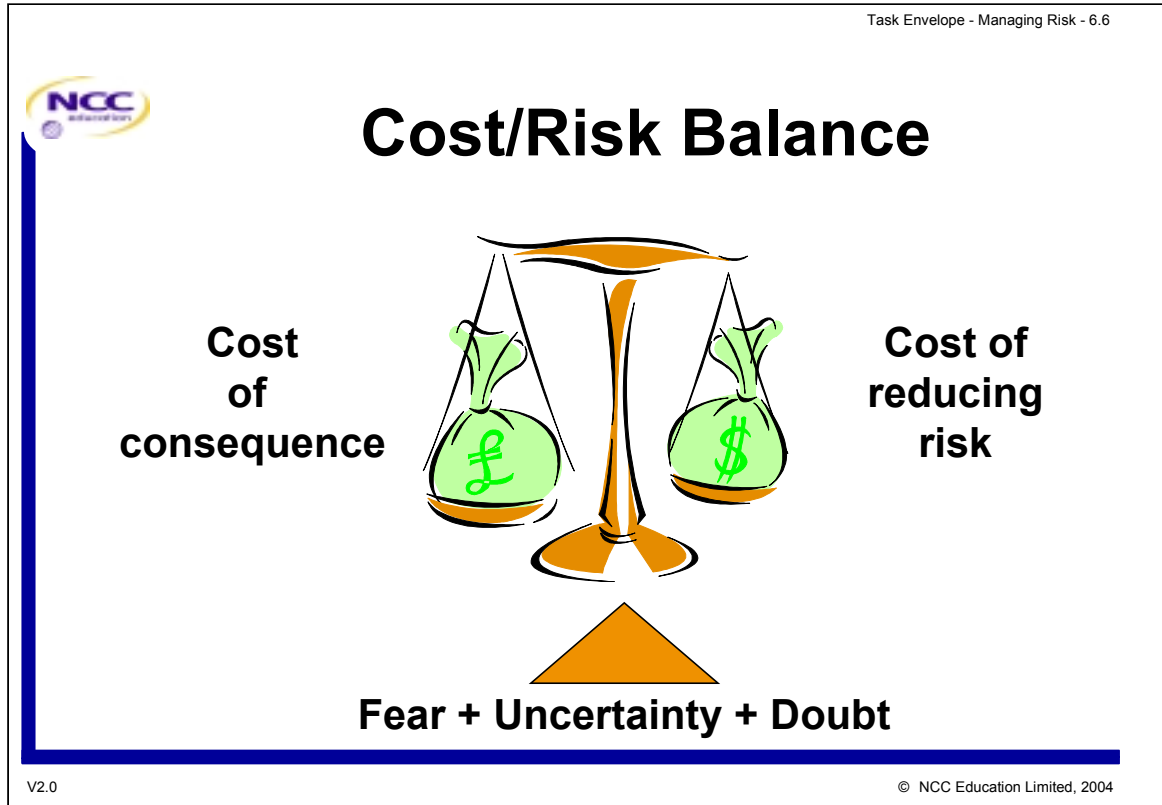
Risk involves a combination of the frequency (or probability) of occurrence of a hazard and the consequences of the hazard occurring. The concept of risk always has these two elements of probability and consequence.

When we hear of risk in everyday life it might be, for example, the chances of a fatal accident when using different types of travel, or it may be a statement that the risk of such an event is very low. This is a little unfortunate as it focuses on the probability aspect, not on the composite aspect of risk. This can lead to inappropriate decisions being made. To do effective risk management we must use both parts of the risk equation.



The process of risk management is shown on this visual. It is a simple iterative process of:

- identify the hazards or threats;
- assess the probability and consequences of occurrence;
- plan what you are going to do about it;
- reduce the chance or impact if it occurs;
- create contingency plans, and monitor risks.

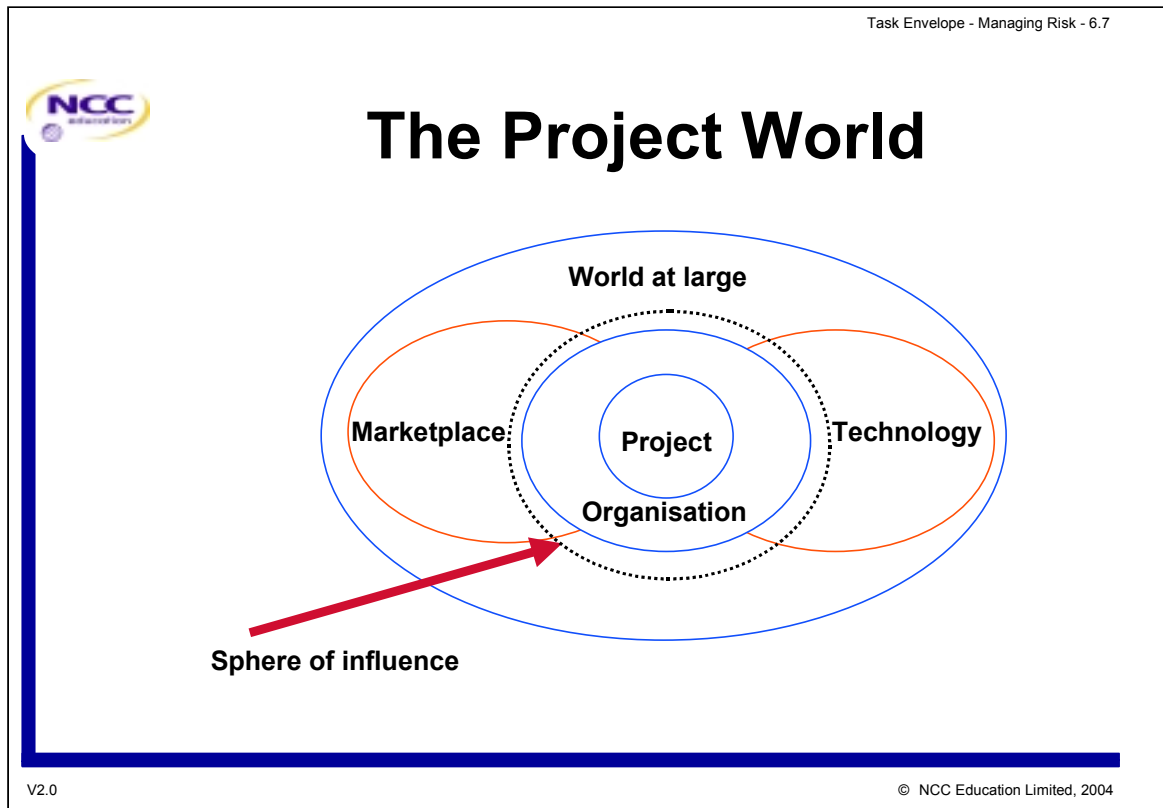


Risk management and particularly risk reduction does not come free.

There is always a balance to be struck between the level of risk minimisation and the level of acceptable cost.

This balance is also affected by the FUD factor – that is the amount of **F**ear, **U**ncertainty and **D**oubt that is present in those undertaking the task or project.

A good illustration of this is how the insurance market works – how the calculations are made for various types of insurance and how much consumers are prepared to pay for it.



It is also important to recognise that a number of factors that influence the risks that face you are often outside your influence or control.

The timescales for delivery can be controlled by the marketplace; the probability of not getting the chips required for the development might be controlled by technology used and the marketplace.

Who would have predicted, however, a world shortage of memory chips caused by a factory burning down. These are not directly controllable events. Risk management will aim to control and manage these risks by finding alternative solutions, but events such as the chip factory fire will almost invariably lead to crisis management.



Consequences

Duration Overrun

- **1 week**
 - \$2,000 damages
 - No impact on customer business
- **1 month**
 - \$20,000 damages
 - Some impact on customer business
- **3 months**
 - \$200000 damages
 - Major impact on customer business



Consider an example, illustrated on the visual, where a project is producing a system to support a major business venture due to start in two months' time.

In the example a one week overrun involves a minor penalty to the supplier's organisation and is of little consequence to the customer, one month overrun hurts the supplier more, but still has little impact on the customer.

A three month overrun has massive penalties for the supplier, but even these may be dwarfed by the losses the customer faces if the project is this late.

The different manifestations may need to be dealt with as separate high level hazards.

The above may seem a trivial example, but consider instead if the product being produced is a friendly or foe detection system for missiles to be fitted to ships of the national navy.

One week delay has little impact, one month means ships are having to be rescheduled for return to home port to have the system fitted, three months delay and ships may go unprotected into a war zone with consequential results that the ship or ships are lost.



Goals of Risk Management

- Identification of potential problems
- Timely response
- Avoidance of crisis situations
- Increased probability of project success

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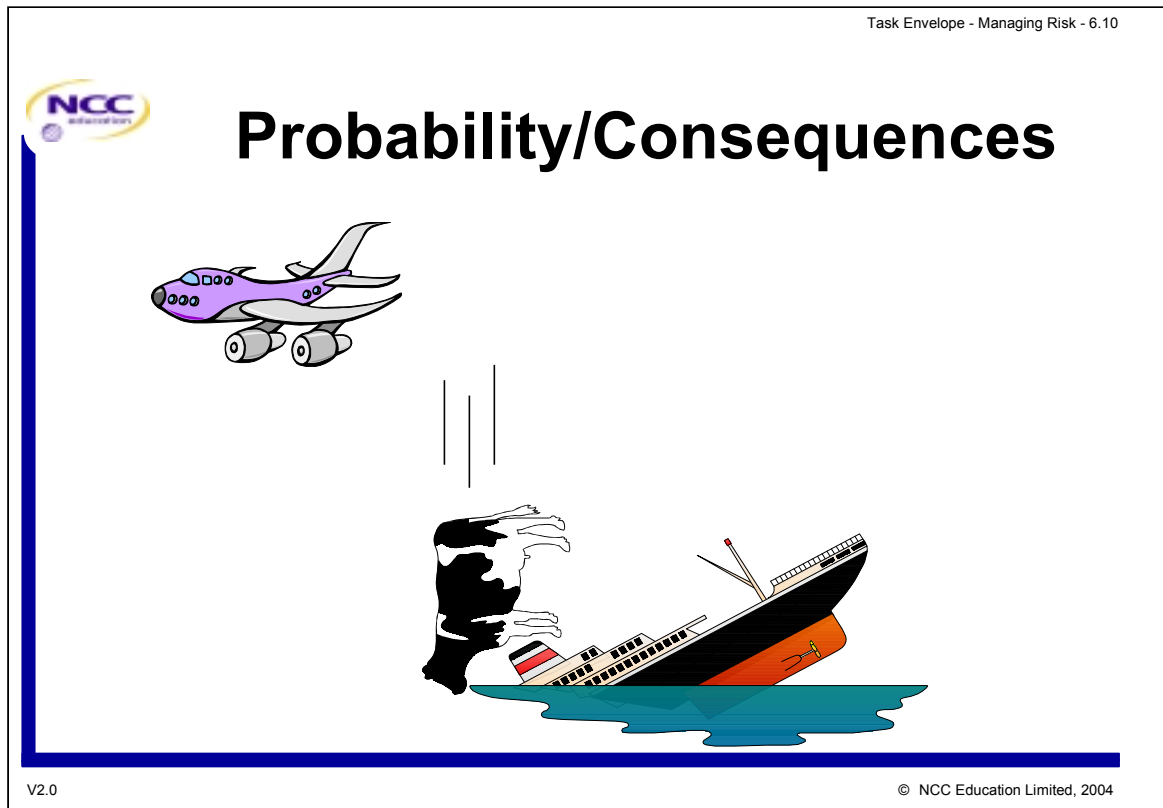
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Project risk management aims to identify and respond to potential problems in time to prevent crisis situations and, therefore, to improve the probability of a project succeeding. The aim is not just to know about the risks but to put in place actions and plans to bypass or reduce the problems associated with those risks.

It therefore is concerned primarily with those risks to the project (and to its underlying development and maintenance processes) that mean the project will not meet its success criteria.

Before considering the application of project risk management it is useful to position risk management with regard to standard project management. Traditional project management is concerned with planning a project and controlling it against the plan which itemises the project tasks, their resources and their interdependencies. Project management attempts to ensure adherence to plans by providing leadership and direction to the project as a whole and making decisions as required based on information derived from project monitoring.

Risk management attempts to ensure project success by trying to identify and control those factors that are not itemised in the plan and that might cause the project to fail to meet its success criteria. Risk management is complementary to standard project management, and represents another tool in the project manager's armoury.



This amusing (but true) story illustrates some of the problems relating probability to consequences.

In April 1997, a Japanese fishing boat working in the sea off Japan was sunk by a cow that fell from the sky.

The terminal velocity and kinetic energy of a cow is left as a class exercise!

The fishermen were rescued, and on telling the police and coastguards what had happened were arrested on suspicion of making the story up.

On investigation, it was discovered that a detachment of Russian soldiers had been doing a little unofficial cattle rustling/trading and were using army transport aircraft to deliver an order. Over the sea, the cattle broke loose inside the aircraft and started running around, causing severe control problems for the pilot, so he opened the cargo doors to remove the problem. This proved effective risk management from his point of view, but shows how one person's risk reduction might be the source of a bigger problem for someone else.

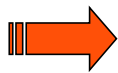
Hamburg Morgen Post 28/4/97, Asahi Shinbun 7/6/97.

- Would Risk Management have been applied in these circumstances?
- Would those affected do anything different in the future? If so what?

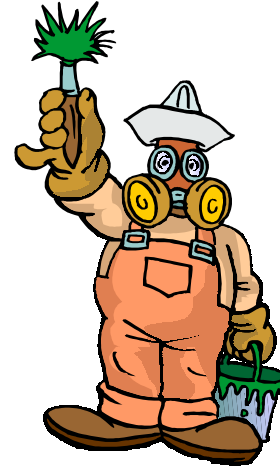


Hazard Identification

**Identify situations
which could cause a
project to fail**



**not meeting project
success criteria**



The starting point for the identification of the top level hazards is the identification of the success criteria that the project has to meet. Generic success criteria may be:

- Predicted milestones have been met.
- Project is completed on time.
- Project is completed within budget.
- Product satisfies its requirements.
- Customer and user needs are satisfied.
- Staff are happy to have worked on the project.

Project management control cannot be imposed at this level.

Detection at this level is too late to allow effective corrective actions.

Top level hazards are often in need of refinement. Some are straightforward, such as budget and timescale overruns, whereas other hazards may involve complex concepts and it is important that they are specified correctly. Examples of this are customer dissatisfaction and poor quality. Quality is a good example to consider – it is important to identify which specific aspects of quality are of concern to this project. *Is it the reliability, the maintainability, or the usability of the product?* Each aspect of quality would lead to different reduction actions.



Hazard Levels

- **Top level hazard**
 - inverse of project success criteria
- **Decompose into influence factors**
 - situations that can be managed
- **Need to manage/monitor**
 - lower level factors that impact hazards
 - symptoms of top level hazards

At the highest level, a project is a failure if it does not meet its agreed success criteria. This implies that top level hazards are simply the inverse of success criteria. However, failure to meet success criteria is usually only apparent at the end of a project. In addition, it is usually ineffective to manage risks only when they occur. This means any actions taken to prevent risks from impacting project success must occur in a timely and cost effective manner. To achieve this, it is necessary to move from these high level hazards to a level at which the individual lower level contributory hazard can be identified before the project fails.

Define factors which contribute to one or more of these top-level hazards. The aim is to identify hazards down to a level at which they can be managed. Sometimes these factors will be able to be treated as hazards in their own right (and are referred to as *second level* or *lower level* hazards). In addition, factors or circumstances that are symptoms that the top-level hazard is increasingly likely to occur can be identified.

Risk management procedures are intended to manage top level hazards by monitoring and controlling lower level hazards and responding quickly to symptoms of the hazards.



Lower Level Hazards

- **Factors which contribute to top-level hazards**
 - **User dissatisfaction**
 - clumsy interface
 - poor response time
 - missing functionality
 - **Look for**
 - symptoms of these
 - hazards which cause this problem
- **Decompose to a manageable level**

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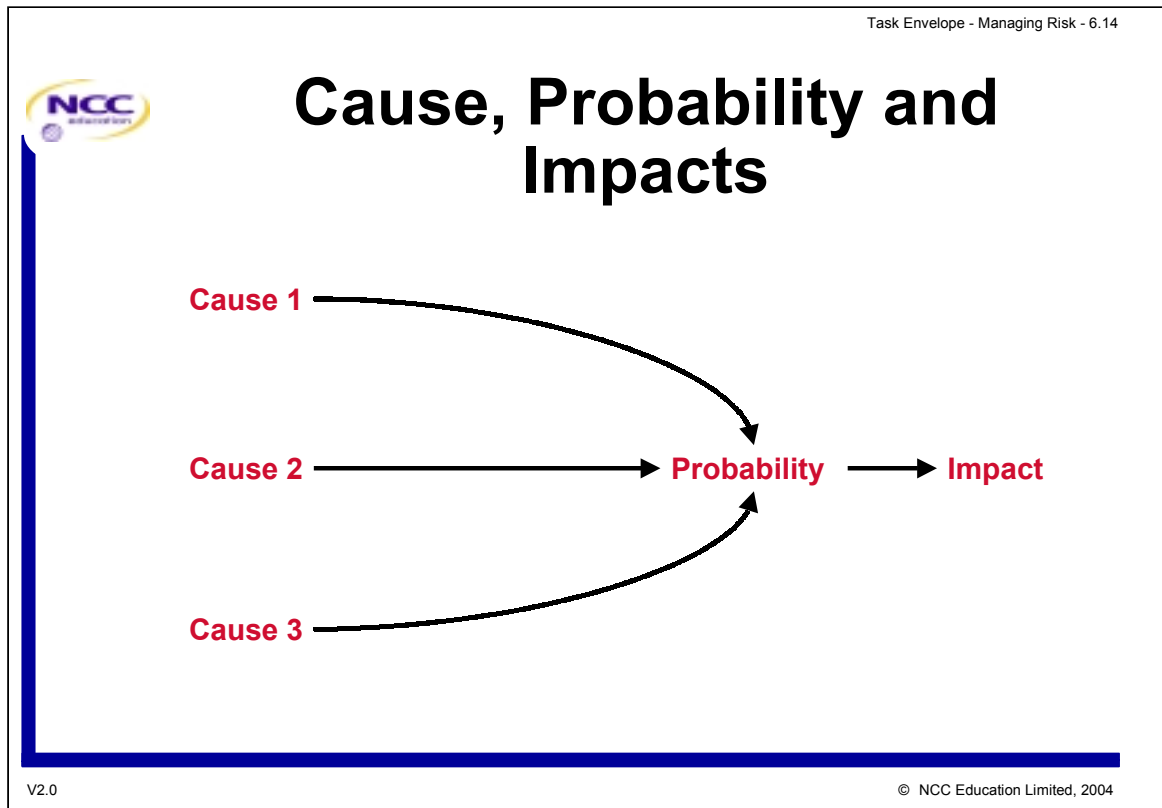
Lower level hazards are derived from the factors that contribute to the failure to meet the project success criteria. Consider an example. User dissatisfaction, one of the top-level hazards, could be caused by one or more of the following three factors:

- clumsy interface;
- poor response time;
- missing functionality.

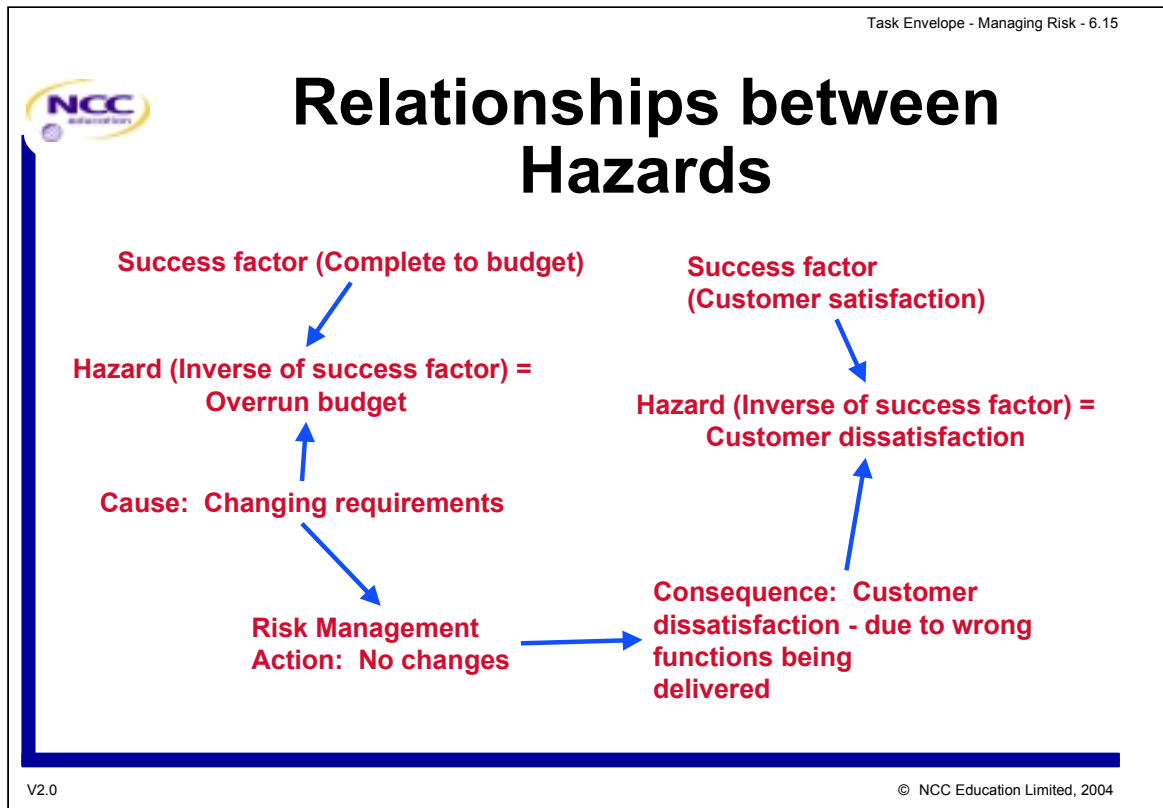
Factors at this level can be managed by looking for underlying symptoms of the condition then using the techniques of risk management to monitor their occurrence and reduce the impact. Decomposition of hazards usually goes down one level, but it may be necessary to decompose to further levels. For example a clumsy interface may be due to:

- lack of consistent interface standards;
- over-complex user interface objects;
- poor menu structure.

If the hazard is still expressed in conceptually vague terms, it will need to be decomposed further. The hazard must be decomposed to a level where it is manageable. If the hazard is expressed in non-objective terms it will need to be refined. For example, poor response time should be expressed in terms of the acceptable or unacceptable response time to specific transaction types (for example, 2 seconds for a database update).



Cause, probability and impact analysis is another way of representing this information, where the lower level events are the causes of the hazards we are really concerned with and many causes can lead to the one event which really concerns us. We cannot manage by working with the final events, we must prevent the lower level causes.



There are often interactions between hazards and strategies for alleviating risk. This is because there are often a number of different success factors in a project, each of which will have been translated into a top-level hazard and refined to create lower level hazards.

One of the success criteria is to complete to within +/- 5%, of the committed budget. The inverse of the success criteria is that we might overrun budget. Budget overruns may have many causes.

Consider the causal factor *changing requirements*. If the hazard of running over budget is managed by refusing to accept requirements changes from the customer, the project then runs the risk of not providing the customer with the functionality required!

This would then result in an increased likelihood of *customer dissatisfaction*, another top-level hazard.



Techniques for Hazard Identification

- **Standard checklists**
- **Scenario analysis**
- **Past experience**

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Hazard identification techniques provide a mechanism for exploiting staff expertise and experience. They help to identify hazards for a specific task or project. As with all activities associated with the management and control of projects, their effectiveness is improved if access to historical information and the experience is available.

There are two main techniques for hazard identification:

- standard checklists;
- scenario analysis.

Standard checklists and scenario analysis are ways of organising how we think about potential hazards. They also benefit from standard *idea generation* techniques like brainstorming and lateral thinking.



Standard Checklists

- **List of general project hazards**
 - Are the requirements clearly stated?
- **Lists categorised for different viewpoints**
 - Stakeholder
 - Hazard types
- **Supporting questions**
 - Have we done this type of project before?



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Checklists, in this context, are lists of hazardous situations that reflect potential problems likely to occur in the user's organisation. Checklists are often organised into categories and may include hierarchical decompositions of hazards.

For example, they may identify generic project hazards such as fuzzy (unclear) requirements, and typically they will be categorised in a number of ways such as:

- stakeholder viewpoint;
- hazard types;
- hazard hierarchies.

Checklists often contain questions which help to establish if a hazard is likely to occur in the particular circumstances being investigated, for example:

- Has the company done this type of project before?

When no checklists exist, they can be created by brainstorming among appropriately experienced people. It is useful if these experienced people are given access to information on past projects.



Scenario Analysis

- What if?
- How?
- Then what?
- So what?



Mechanism for organising local expertise

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This technique is similar to that applied in traditional risk management and revolves around two questions:

1. What happens if a certain condition occurs?

- For example, what happens to the power station if this pipe breaks?
- In software terms, what happens if the new hardware does not give the performance improvement we expected?

2. How could we get into this situation?

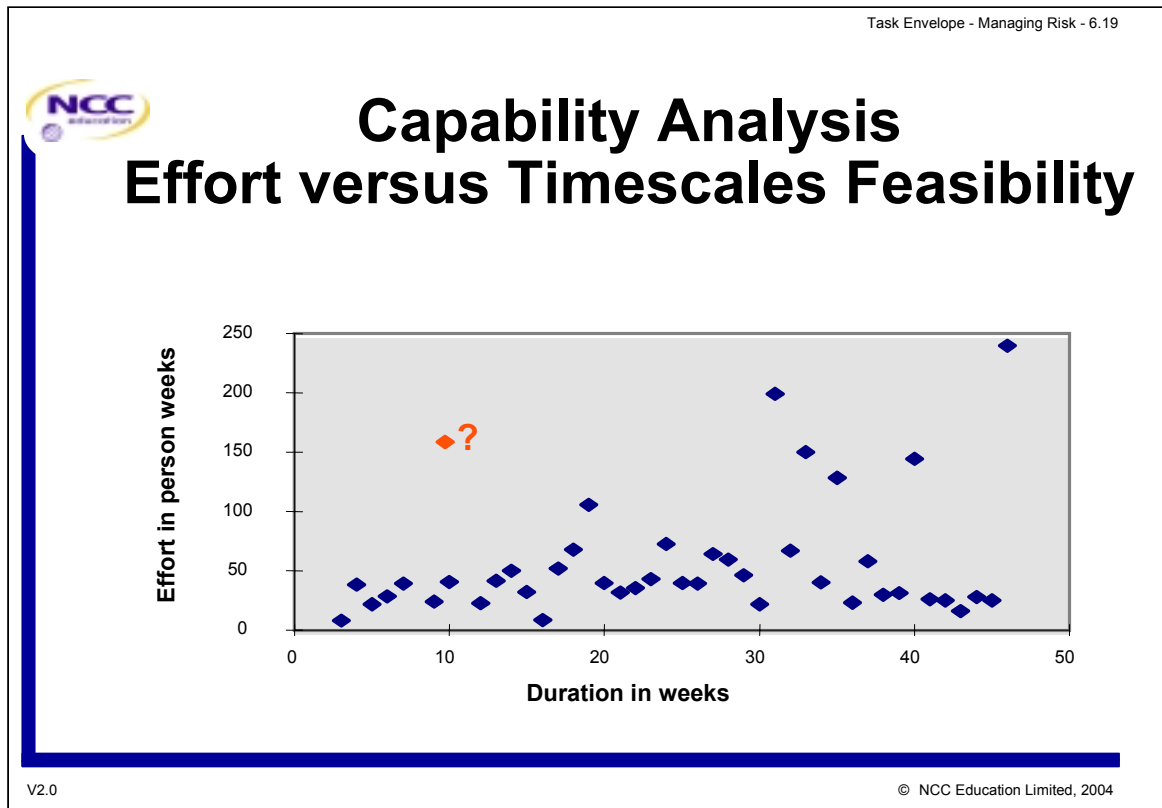
- For example, what could cause the project to have a schedule overrun?

Although assessment and prioritisation is not recommended at this stage, it is worth capturing the information on the consequence as it will almost certainly come out of the discussions. This is performed by supplementing two further questions:

- What would happen then?
- So what; does it really matter?

Scenario analysis allows local knowledge to be organised by providing a structure for discussion and evaluation.

Scenario analysis is extremely dependent on the people who are involved with it. If it matches the way in which people are happy to work it is an extremely powerful technique.



Where detailed information on past experience exists, both the checklist and scenario approaches can be supplemented with a technique known as *capability analysis*. The aim is to compare project requirements with the *norm* for that organisation or team. An obvious example is to compare timescale and effort requirements with past achievement.

On the graph shown, the blue (black) points represent all the historical projects undertaken by an organisation. The red (grey) point identifies the required effort and duration of the new project. Initial assessment is that the new project is unlikely to be delivered on time. Note there is a wide spread in this data, reflecting the diversity of projects undertaken by the organisation. This does place a limit on the usefulness of this data, but it is still possible to detect projects which are beyond the existing capability of the organisation.

In principle, quality and performance requirements can also be assessed in this way. However they are usually more difficult to assess as they are often stated in very vague terms.

Consider the reliability of the product. If a product must be *highly reliable* it is difficult to know if the requirement can be achieved or not. If, however, the reliability requirement is stated as 'no more than 1 failure per 1,000 hours of running, after system test', it is objective and can be compared with the average value for previous comparable products. If the experience was that systems had one failure per 200 hours of running, after system test, then the production process probably lacks the capability to deliver the required product.



Risk Assessment and Prioritisation

- **To identify order in which risk should be addressed**
- **Quantitative approach**
 - **Risk factor = Probability * Cost of consequence**
- **Qualitative approach**
 - **where numerical values are unavailable**

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To be economically effective, risk planning, monitoring and control must concentrate on the important risks. This implies that risks are ranked and ordered. It is also necessary to understand the cost and effects of different strategies for removing or alleviating the risk. The aim of risk prioritisation is to identify those risks that are candidates for immediate action, while there is still room to manoeuvre, rather than waiting until they develop into insoluble problems.

We can measure the risk associated with a hazard by the formula:

- Risk factor = Probability * Cost of consequence of hazard

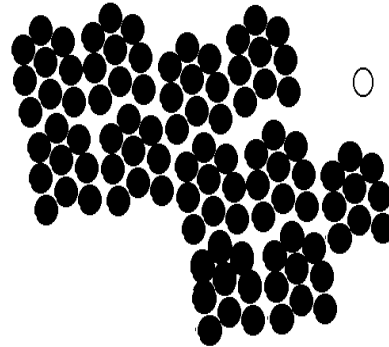
Obtaining a numerical value for a risk allows us to assess its relative importance and address those risks with the highest value. However in practice other factors will cause some hazards to be of a higher priority, perhaps because the consequences of the hazard are so great that no matter how small the probability of occurrence is, the hazard must be guarded against. A good example of this is the loss of the family home due to fire. We all tend to insure against this despite the probability of it occurring being very low.

When numerical values are available for probability of occurrence and the cost of occurrence, the basic equation can be used. Unfortunately, in Information Systems we often lack such values and we are forced to use subjective approaches to risk evaluation. These approaches are based either on straight categorisation of risks or on quantification using ordinal scales such as *high*, *medium* and *low*.



Equivalent Probabilities

- Picking white ball from a bag
- 0.01
 - 1 white ball
 - 99 black balls



Before moving on to talk more about the subjective approaches, it is important to understand the basic principle of probability.

There is a 0.01 probability of picking the white ball from a bag of 100 balls, where only one ball is white.

If 50 of the 100 balls were white, then the probability would be 0.5.



Subjective Probability

- Almost certain
- Highly likely
- Probable
- Unlikely
- Impossible

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As frequency of occurrence information is unlikely to be available, it is necessary to determine an intuitive scale that can be applied.

This approach has significant problems because *intuitive names* in fact mean different things to different people.

In an experiment the answers of 24 people were plotted, who were asked to assign a probability in the range 0% to 100% to the statement that something would be 'almost certain to happen'. The vast majority of answers are in the range 75% and above, but there are some that equated 'almost certain' to less than 60%.

The same group assessed 'unlikely' to be between 0% and 30%. This emphasises the need to ensure that qualitative scales have a consistent interpretation by all users. In general, people are better at comparative ranking than absolute judgements!

Task Envelope - Managing Risk - 6.23



Risk Categorisation Scales

		Probability		
		High	Medium	Low
Impact	High	A	B	C
	Medium	B	C	D
	Low	C	D	D

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This is a simple prioritisation matrix. As demonstrated by the previous visual, it is useful to allocate meaningful interpretations of the *high*, *medium* and *low* points on both scales. This will vary from project to project. These interpretations could be:

Priority:

- High: The probability of a 10 year old car breaking down on a long (>500 miles) journey.
- Medium: The probability of a 5 year old car breaking down on a medium journey (approx. 250 miles).
- Low: The probability of a 1 year old car breaking down on a short (5 mile) journey.

Impact or consequence:

- High: Loss of life.
- Medium: Serious injury.
- Low: Bruises or scratches incurred.

The values as read in matrix are:

- A Risk must be reduced.
- B Risk should be reduced if affordable.
- C The risk should be tolerated.
- D The risk should be ignored.

This is an example of how two subjective values can be combined. Used by many military and medical professions, it is referred to as *triage*.



Risk Management Planning

- **For each risk under consideration**
 - identify strategies to prevent the hazard
 - actions to take if the hazard occurs
- **Identify risk reassessment procedure**

Planning is essential, as each risk reduction activity is likely to be in addition to normal project tasks. So if the risk reduction activities are not planned, resourced and allocated to an individual for action, then they are unlikely to be performed.



Risk Reduction Strategies - 1

Risk Avoidance

- Get rid of any impact
- Make it impossible to happen

Risk Alleviation/Reduction

- Don't try to remove all risk
- Reduce impact or probability to an acceptable level

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Risk Avoidance

Means attempting to change the preconditions that could create a hazard. This might be achieved by negotiating a change in requirements. For example, if it was highly unlikely that a given project would meet both a very high reliability target and a very stringent performance target, you could go back to the user and see which is of higher priority, perhaps performance was not really that important.

Alternatively, the use of faster hardware could be investigated to alleviate the performance problems. This might be considered as a means of reducing the probability of a clash between reliability and performance requirements to zero. Failure to remove the risk completely might well leave us with a need to employ an additional risk avoidance strategy to reduce the level of risk to a tolerable level.

Risk Alleviation

It is important to take a cost effective approach to handling risk. It is easy to assume that all risks have to be completely removed; this is not the case. Risk reduction occurs when the risk cannot be removed, but actions can be placed in plans that will either:

- reduce probability of occurrence of the hazard; and/or
- reduce the consequences of the hazard.

The mechanisms that are used for this are exactly as for risk avoidance, with the additional strategy of *buying* information. For example the risk of user non-acceptance of a new user interface can be reduced by prototyping parts of it. This extra action of *buying* additional information is a form of investment frequently found in risk management situations.



Risk Reduction Strategies - 2

Risk Transfer

- Time
- Space
- Someone else
- Insurance

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Many forms of *risk transfer* exist which attempt to remove or reduce a risk by transferring either the problem or its consequence to somewhere where it does little or no damage to the project.

Transfer in Time

Suppose you are worried about the consequences of a high level of requirements change from past experience with your customer. *Transfer in time* is achieved by defining incremental releases of the system such that any changes are delayed and batched up for inclusion in future releases. Thus the problem is reduced or removed by transferring it to a point when the consequence is planned and controlled. If the system is being supplied in a commercial situation, you would also negotiate a price change for each set of requirements changes.

Transfer in Space

Suppose you are developing a system for authorising credit and your systems analysis detects a particularly difficult borderline case to deal with. Programming this condition is difficult, because the current manual system relies on human judgement, so the system would probably need to employ Artificial Intelligence (AI) techniques. This risk can be transferred in space by, at least initially, continuing to support evaluation of this condition manually. This means we can defer the production of a software implementation. Effectively this combines transfer in space and time.



Risk Reduction Strategies - 3

Risk Transfer

- Time
- Space
- Someone else
- Insurance

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Another example involving a literal transfer in space, is drawn from early space probes. In this case there was a major operational risk because the onboard computers were not powerful enough to calculate orbital corrections. This risk was removed using risk transfer by performing the calculations on a ground-based system and then transmitting the results to the probe. This was only a small system change and had in itself very low risk.

Transfer to Someone Else

Suppose you are developing a system that requires the use of AI techniques and your development group doesn't have such experience. This hazard can be transferred to someone else by subcontracting to a specialist organisation who does have the relevant experience. If, additionally, you ensure that the subcontractor takes some of the impact of non-delivery of the software by imposing penalty clauses, then the risk is alleviated further.

Buying Insurance

This can take many forms from literally buying an insurance policy to, more commonly, implementation of a fallback option which, if the risk doesn't occur, will be thrown away.



Creating a Risk Action Plan

- Hazard
- Risk reduction strategy
- Constraints
- New hazards
- Contingency plan
- Responsibility

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For each identified risk it is necessary to create an action plan. This effectively documents the requirements following the identification and assessment exercises, and should be prepared prior to undertaking any action. The aim of the plan is to:

- identify risk resolution actions;
- identify any hazards created by actions;
- identify action or contingency plans in case of:
 - failure of risk resolution;
 - new hazards arising.

Example:

Hazard – Memory insufficient due to software size being underestimated.

Risk reduction strategy – Do early prototype and prioritise requirements.

Constraints – Time and budget limits.

New hazards:

- Prototype – Time and effort needed and scale up problems.
- Prioritise requirements – customer resistance.

Additional actions:

- Prioritise requirements internally.
- Use incremental development.
- Use earned value tracking.

Responsibility – Jane Smith.

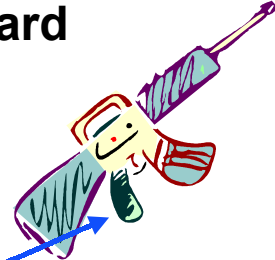


Risk Monitoring

- Identification of risks starting to happen
- Identification of emerging hazard
- Tracking and reporting

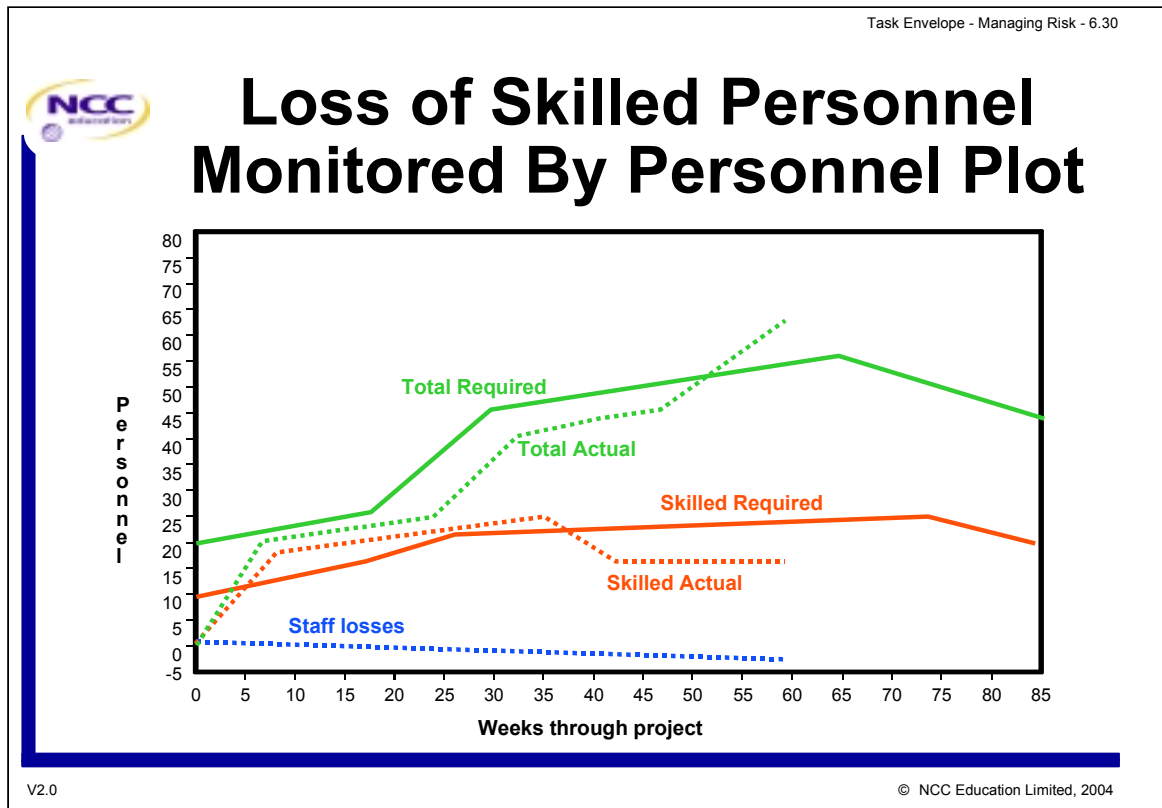
Need

- Contingency plan triggers
- Problem detection mechanisms
- Control mechanisms and visibility



Risks need to be monitored as part of a continuous iterative process.

It may be necessary to introduce some new monitoring processes so that symptoms can be identified as soon as they appear, and the necessary actions put into place before the impact of the hazard becomes unmanageable. This is synonymous with the installation of a smoke detector to trigger an alarm should a fire break out in a building – you don't wait for the building to be burnt down before calling the emergency fire service.



For example, an organisation may perceive an unacceptable risk to a particular project to be loss of skilled personnel. This may be monitored by plotting a graph as shown on the visual. This clearly shows that although the total number of staff on a project is currently higher than required, the number of skilled staff has dropped below the required level.

A decision needs to be taken on the action required by the project.



Risk Reassessment

- **Periodic reassessment at major milestones**
- **Recovery from crisis**
- **Re-assess hazard priorities - old and new**
- **At all times monitor the behaviour of critical risks**

The basic approach has emphasised the need for regular risk reassessment to detect those risks that are increasing in probability and to identify any new risks that may be occurring.

This reassessment needs to be undertaken at regular intervals and at critical points in the process.



Feedback

- **Using experience to improve the risk management process**
- **All organisations need an improvement programme**
 - **monitor methods - technical and management**
 - **find ways to improve them**

In order to improve risk management, we must feedback the results of its application to improve the management of other projects. This feedback can be at the individual level of project managers extending their own experience of risk management, but should also take place at the corporate level, and it is on this level we will focus, although many of the principles apply to both.

Improved risk management is based on two dimensions, each of which needs to be addressed:

Information dimension:

- What are the risks?
- What are the impacts?
- How probable are they?
- What actions work?
- What detection methods?

Experience dimension:


- Appreciation.
- Knowledgeable.
- Skilled.
- Expert.



Summary

- **Successful innovation means taking and controlling risk**
- **Definition of project success is crucial**
- **Standard project management assumes the usual happens**
- **Risk management assumes the unusual happens**

The use of risk management stimulates healthier project management, especially when a complex project, facing many hazards is being undertaken. It hopefully creates a situation where there are no surprises and crises are prevented, or swiftly handled. This leads to a reduction of costs, less rework and more competitive pricing, since risk is not managed by every person in the bid chain adding their '10%' contingency to the real estimate for the task in hand.



Task Envelope - Completion - 7.1

Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 7 Task Envelope - Completion

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There is certain to be a point in time when a task has come to an end.

- How successful was it?
- Does the product meet its requirements?
- Are you still communicating with your customer/sponsor?
- Will the product ever be used?
- Who is going to maintain it and how?
- Can we learn from the experience?

This session looks at each of these issues, and explores some of the difficulties that may be encountered. We shall also look at a real life case study of the London Ambulance Service Command and Control System which was publicised in the UK during and after the formal public enquiry.

Task Envelope - Completion - 7.2



Session Contents

- **Purchaser/supplier relationship**
- **Acceptance demonstration**
- **Evaluation of results**
- **Transition to operation**
 - and on to maintenance ?
- **Post implementation review**

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This visual outlines the agenda for this session.

Task Envelope - Completion - 7.3



Customer/Supplier Relationship

- **Acceptance is sponsor's ultimate weapon**
 - product not accepted => supplier not paid
- **Actually customer or sponsor's responsibility to ensure effective acceptance**
 - this is also in the suppliers interest
- **Must be fair to supplier**
 - by evaluating the right thing
 - by evaluating in the right way

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When a task comes to completion, there will almost certainly be a product of the task that is required to be handed over to the sponsor of the task.

This sponsor may be a client, or it may be a manager or a colleague either local to your department or from elsewhere in the organisation. Whoever the sponsor is, it should be remembered by all parties that the *acceptance* of the product being handed over is the ultimate weapon of the sponsor. Depending on the terms of the specific request, the task worker may not get paid if the product is not *accepted*. It would certainly not be a career enhancing action to hand over a product that is not of appropriate quality – i.e. fit for the purpose for which it was intended.

So, although acceptance and the surrounding controls are really the sponsor's responsibility, it is in the task worker's interest to ensure that the process goes as smoothly as possible and does not instigate later recriminations.

The next few visuals are therefore included to help the *worker* (supplier) ensure that the *sponsor* (purchaser), has all the information necessary in order to undertake a fair process.



Evaluating the Right Thing

- **Requirement specification only**
 - ensure each documented requirement is 'testable'
- **Perfection is rarely possible**

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It should be emphasised, that the product should only be evaluated and hence accepted on the basis of the requirements that have been documented and agreed between the two parties.

One way that the worker or supplier can assist in this process is to evaluate the requirements very early on during the task (and when every change request arrives), from the viewpoint of “How am I going to demonstrate that this has been achieved?”

This approach has a two-fold benefit:

- If there are any ambiguities in the requirement, this approach should iron them out fairly quickly.
- If it is not possible to demonstrate any particular requirement – then it could be that further investigation is required, as this indicates that a requirement is too vague.

It should also be noted that perfection is rarely possible, especially where software development is involved and agreement should be reached on the level of problems that are acceptable for hand-over to take place – prior to the start of the acceptance demonstration.



Untestable Requirements

- **“The supplier will use the latest engineering techniques in the development of the system”**
- **“The system clock will be accurate to within one second in 100 years”**
- **“The system response to the operators will be very fast”**
- **“The system will be very easy for our operators to use and will be easy to maintain”**
- **“The supplier will guarantee that the system will never, under any circumstances cause user data to become corrupted”**

This visual demonstrates some of the requirements that have been seen in Information Systems Requirements Specifications over the last few years.

Each of these requirements has an element that is neither testable nor demonstrable.



Evaluating in the Right Way

- **Be prepared to be objective about ‘defects’ and ‘faults’**
- **Work with the supplier - not against**
- **Apply configuration management to test documentation**

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- Be prepared to be objective about *defects* and *faults*:
 - Does it matter?
 - Is the specification correct?
 - Is it really a system fault?
- Work with the sponsor – not against:
 - Likely to be faults on both sides.
 - Better to co-operate, consider present and future requirements, and not to argue about the past.
- Apply configuration management to test documentation:
 - Remember that the test documentation may be at fault – if it needs correcting, ensure that the version number and date are updated.



Planning Acceptance

- **Select/define tests**
- **Define completion criteria**
- **Estimate timescales and effort**
- **Allocate resources**

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- Select/define tests:
 - what is to be tested and how?
- Define completion criteria:
 - how much testing is enough?
- Estimate time-scales and effort:
 - including preparing scripts, data, actual testing and potential re-testing.
- Allocate resources:
 - responsibilities for test design, test running, problem resolution and final approval.



Types of Acceptance Tests

- **Correct function tests**
- **Correct response to abnormal situations**
- **Performance**
- **Non-functional 'ility' tests**
- **Documentation and configuration**
- **Alpha and beta testing**
- **Human factors**

This visual lists some types of tests that can be performed on an Information System Development product:

- Correct function tests – does it do what it should?
- Correct response to feasible abnormal situations – when unusual or abnormal conditions occur, does the system behave as expected?
- Performance – does the system cope with extreme (low and high) levels of:
 - stress; volume; timing; capacity.
- Non-functional *ility* tests – *reliability*; *usability*; *maintainability*; etc.
- Configuration – are all the correct *bits* or components present?
- Documentation (installation, user, maintenance) – is the documentation complete and usable by the intended reader?
- Alpha and beta testing – are alpha (in company use) testing or beta (other company use) testing appropriate?
- Human factors – does the system support or hinder the users in performing their tasks?



Evaluation of Results

- **Three possibilities**
 - **Yes the product has passed without qualification**
 - **Yes, the product has passed, but with reservations**
 - **No, the product has not passed with reasons given**
- **Reaching agreement not always easy**
- **Objectivity very important**

Be prepared for three options, as shown in the visual, when the results of the acceptance are presented.

The first of these possibilities is the most unlikely – there is nearly always something that needs to be amended.

It is very easy to feel victimised when problems are found with the work performed – but it is important to remain objective, and look for a constructive strategy to correct any problems encountered and move forward with the completion of the task.



Transition to Operation

- **Configuration management of the system**
 - what exactly does the sponsor accept?
- **Backup and archive**
- **Training of users**
- **Handover**
 - cutover; pilot; parallel?
- **Ensure adequate maintenance procedures**

This specifically relates to the development of an Information System product.

One would hope that all of these topics will have been addressed prior to the end of the development – but now is a good time to ensure that everything is in place, and the plans for the next stages following the development are in place.

- *Configuration management* of the product – what exactly does the sponsor accept?
- *Backup and archive* – have all the electronic files been archived, and are procedures in place for continuous back up of data?
- *Training of users* – have the users been trained and do they feel confident?
- *Handover* – will it be a *big-bang* changeover; is there a pilot system for part of the product, or is there enough funds (and is it appropriate) for parallel running?

Ensure adequate maintenance procedures – the key question here is ‘WHO is to maintain the product and how?’



Maintenance

- **Clearing faults?**
- **Adding new features?**
- **Adapting to a different environment?**
- **Maintaining the integrity of the system?**

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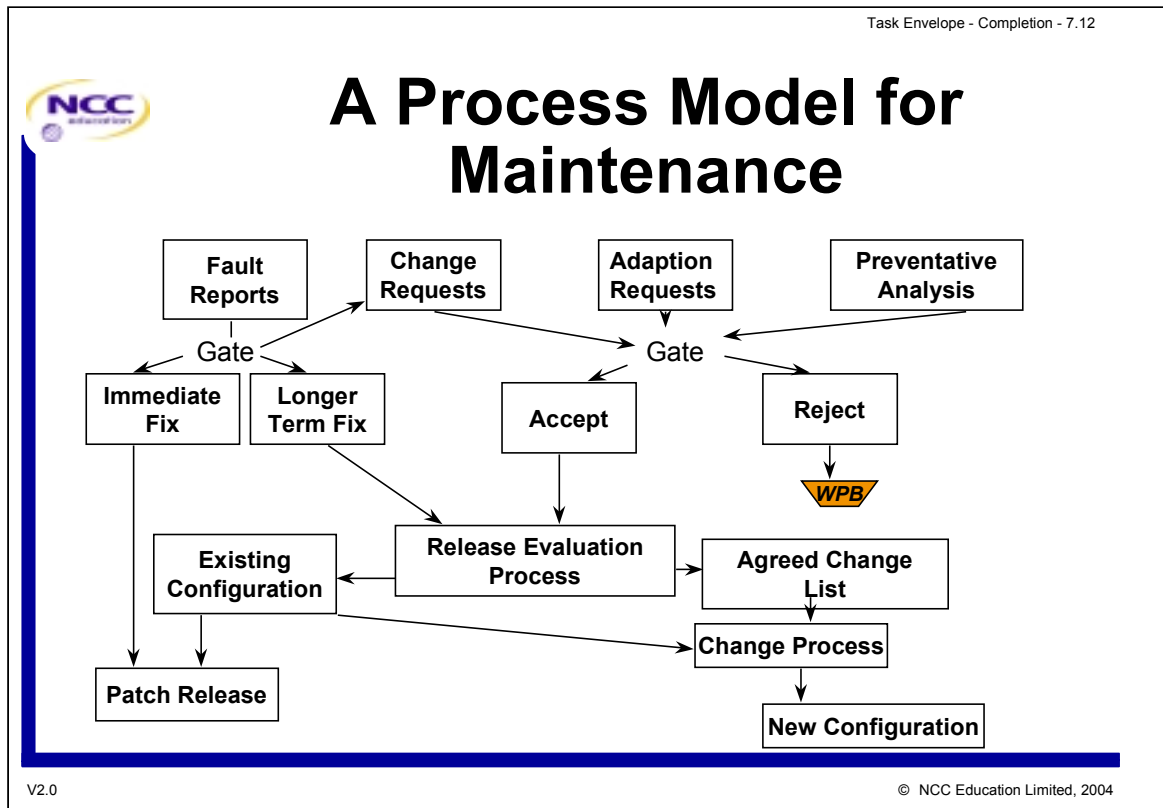
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“What is Information System Maintenance?”

- Clearing faults? = Corrective Maintenance
- Adding new features? = Perfective Maintenance
- Adapting to a different environment? = Adaptive Maintenance
- Maintaining the integrity of the system? = Preventative Maintenance

One of the main issues with IS maintenance is the establishment of an appropriate contract, along with service level agreements to ensure that the system can be maintained within the users operational environment. Each of these different types of maintenance need to be covered.

This contract should be negotiated prior to handover – and may indeed be issued to a third party.



This visual shows a typical process model for maintenance.

The acronym WPB = Waste Paper Bin!

Controls and safeguards are necessary to retain the integrity of the product that is delivered.

- Each process must have its own control.
- The *gates* must be stringently controlled.
- Must have version control.
- Need appropriate fault removal and test procedures of any changes made – including regression testing, i.e., ensure that no faults have been introduced into other areas of the system.

Task Envelope - Completion - 7.13



Mission Accomplished - Celebration or Commiseration?



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So, now the task has been completed, handed over and everything is set for maintaining the product (possibly outside of your responsibility) – what do you do? Forget all about it?

Whether the project has been a great success, or a foot-dragging failure, completion is a good time to learn from the experience and build a foundation for future successes.

It is often assumed that people learn from experience alone! It would be more accurate to say that they can learn from the information that has been kept. With the exception of a few remarkable people human memory is only accurate over a very short period. It is important therefore to record history as it happens, in sufficient detail to reconstruct the order of events and the project status at the time. This is useful to keep in a project log that forms the basis of any post development analysis.

Unless the need to learn from past experience is recognised and accepted, the next project will repeat most, if not all, of the problems in the previous one.

A mandatory component of the *deliverables* of the project should be a post development review report that incorporates lessons learnt from the just completed project. The effort required in producing a good report could be minimised if the project monitoring has undertaken ongoing analysis of data during the project.



Gathering Data

- **Project review meeting**
- **Project review questionnaire**

Some projects hold a project review (post-mortem) meeting at the end of the project. Others collect email summaries of what each project member thinks has worked or not worked.

Ideally, collect the project members' impressions about the project within 15 – 30 days of completion. After a longer period of time, project members begin to forget important insights, and assembling or reconstructing end-of project status data becomes more difficult.



Project Review Meeting



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Project review meetings can be valuable times for team members to discuss their insights candidly, and those insights can be tremendously beneficial to the organisation.

To prevent the meeting degenerating into a gripe session, try and arrange for an independent, objective moderator to be used. An objective moderator will make sure that all sides of each major issue are discussed and will keep the members from drowning in any single topic.

Ensure all interested parties invited provide a summary of relevant information, and ensure that notes are documented and archived in a form that can be used by subsequent projects.

If a project log has been kept, providing information on which to base the discussions can be significantly easier.



Project Review Questionnaire

- How was it for you?
- What could we do better?
- Free form comments



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Some projects have had good experience of using a three-part project review questionnaire. The first part contains numerical rankings of various project attributes:

- “How would you rate the project control over changing requirements on a scale of one to five, with one being too restrictive and five being too lax, and three being just right?”

This allows project members’ subjective evaluations of the project to be compiled in a quasi-quantitative form.

The second part of the questionnaire contains targeted questions about specific areas that might need improvement. This part might need project specific questions such as:

- “We used a staged delivery approach for the first time on this project. In your opinion, how helpful was that in meeting our project’s objectives? How could the approach be improved?”

The questions (and answers) in this part can be used to direct the discussion in the Review meeting if one is held as well.

It is also important to include a free format comments area on the questionnaire, as you will certainly not include specific questions on all the topics that the team members wish to comment on.



Project Log

- **Context**
- **Project data**
(Estimates and Actuals!)
- **Lessons learned**



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Ideally, a log should be kept during each project or task – but it is worth putting effort into creating a summary of the contents, and presenting it in a format that will be of use to future projects.

It is important to put the information into context, and describe the original purpose of the project, who the stakeholders were, and what their success criteria consisted of.

Describe the approach(es) taken to undertake the task or project, and the team that was involved, along with staffing levels.

Data that was collected should where possible be presented in graphical form. Such data for an IS development project may comprise:

- Actuals for schedule and effort as of the release date.
- Size of product at release date (lines of code, or number of modules).
- Defect or problem count as of the release date.
- Graph showing each schedule estimate compared to the actual schedule over time.
- Graph showing each effort estimate compared to the actual effort over time.
- Graph showing deliverable production over time.
- Graph showing outstanding and resolved defect count by week.

Task Envelope - Completion - 7.18



Lessons Learned



- **Planning**
- **Requirements**
- **Development**
- **Risks**
- **New technology**

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The project log should also contain a description of the lessons learned whilst undertaking the project or task:

- *Planning* – Were the plans useful? Did the team adhere to the plans? Was the quality of the project personnel sufficient? Were the number of personnel in each category sufficient?
- *Requirements* – Were the requirements clear and complete? Were they stable, or were there many changes? Were any changes managed effectively? Were they easy to understand, or were they misinterpreted?
- *Development* – How effective were the techniques, methods and tools used during development and test (if appropriate)?
- *Risks* – Was the risk assessment undertaken? Did any hazards occur that were not identified during the risk assessment? How effective were the risk reduction actions? Was it necessary to resort to contingency plans, and were they effective?
- *New technology* – What impacts did new technology have on costs, schedules and quality? Did managers, developers and users interpret these impacts in the same way?



Project History Conclusions

- **Create planning checklist**
- **Feed major risks into a “Top 10 Risks List” template**
- **Distribute conclusions**

There is no point in doing all the above, if the output of the review is subsequently archived and forgotten.

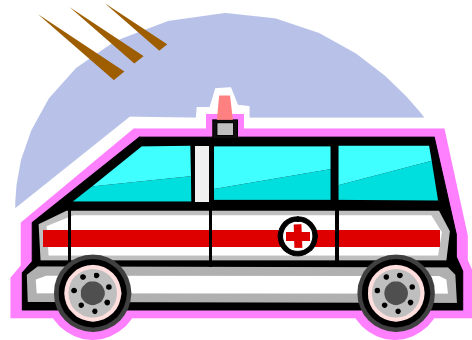
Information must be fed into other projects, so that they can learn from your experiences.

All the recommendations for future practice need to be incorporated into checklists that are used on all projects.



London Ambulance Service

- What went wrong?
- Why?
- What should have been done?



The main objective of the London Ambulance Service case study is to establish the benefit of post project reviews.




Summary

- **Good relations with sponsor essential**
- **Objectivity essential**
- **Common-sense and an understanding of today's (and tomorrow's) needs help**
- **Learn from the experience - don't throw it away!**

For all the activities that have been discussed in this session, the main issues are:

- It is essential to retain good relations with the sponsor or purchaser.
- Maintain objectivity – and don't let anything become *personal*.
- Be aware of both current and forthcoming.
- Last, but not least, learn from the experience – don't throw it away!

Time Management - Managing Your Time - 8. 1


**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 8
Time Management -
Managing Your Time**

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One of the first tasks required in any time management programme is an assessment of the current state. Request that students prepare a Time Log of a typical day, recording for each activity or task:

- time started;
- activity undertaken;
- pay off – or value (low, medium or high);
- duration;
- whether planned or not;
- could the task have been delegated?

Reference to Alesandrini, *Survive Information Overload*, ISBN 1-55623-721-9, Pub Irwin, 1992, may provide useful further background to this session.



Time Management Myth 1

“Focus on your goals and only the information relevant to them, then ignore the rest”

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Information fuels knowledge, which is the lifeblood of the manager. That knowledge, however, must relate to the entire system; otherwise, the left hand doesn't know what the right hand is doing. Miss one key piece of information about your supplier, customer, competitor or emerging trend, and you risk not only productivity and success, but ultimately your business survival.

An accurate and useful view is necessarily a broad one.



Time Management Myths 2 & 3

- “Don’t waste time with unimportant people”
- “Place a ‘Do not disturb’ sign on your door to limit interruptions so you can be more productive”

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With regard to the statement in the first bullet point, the seemingly *unimportant* person, whether an employee, customer, supplier, or even competitor, may prove *pivotal to a firm’s future success!* If you act as though you believe this maxim, then those *unimportant* people will soon realise this, and make alternative arrangements for their comments or demands:

- An employee could become demotivated and resign.
- A customer could take their business elsewhere.
- A supplier could stop providing your company with preferential terms.
- A competitor may take a joint-venture proposal elsewhere.

Regarding the statement in the second bullet point, admittedly you do need some time with limited interruptions, but you *must not forget that collaboration and effective team working* are the key issues in productivity – so investigate alternative solutions to handling interruptions.



Time Management Myths 4 & 5

- **“Carefully plan ahead and schedule your time on a daily basis”**
- **“Never handle a piece of paper more than once”**

If you plan your day to the smallest detail, then you will not achieve the majority of your planned tasks. Ensure that several sections of the day are unplanned – to cater for the unexpected. If, by some chance, the unexpected doesn't happen, then make constructive use of the time by re-allocating it to appropriately categorised tasks

Insisting on handling a piece of paper only once, means that everything needs to be dealt with as it appears. This is often not an effective use of time. Many items will cross your desk that need significant time to study, digest and deal with – these need to be categorised and scheduled for handling in suitable time slots.



Master Control System

- **Keep a view of the ‘big picture’**
- **Categorise information**
- **Use only one calendar**
- **Enter information only once**
- **Begin each category with a top-down view**

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Just as an airline pilot uses a master control panel to monitor and fly an aeroplane consisting of many complex subsystems, you can keep track of yourself, your staff and your company with a Master Control System (MCS). It funnels an unmanageable collection of dates, times, numbers, names and other needed data into one centralised resource available at your fingertips.

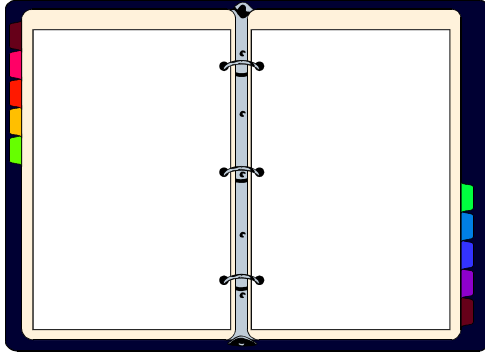
An MCS may consist of anything from an individual time planner if properly used to a company-wide computerised Executive Information System.

What to do:

- Categorise your 12 most important activities – these should include major projects; activities that you monitor; people with whom you deal; information that you need. Any area that consumes hours of your time on a weekly basis becomes a candidate for separate category.
- Funnel ALL important data through the MCS.
- Begin each category section with a top-down view – relating details to the major categories.
- Ensure that your files remain consistent with your MCS.
- Carry the MCS with you at all times.



Use Appropriate Technology



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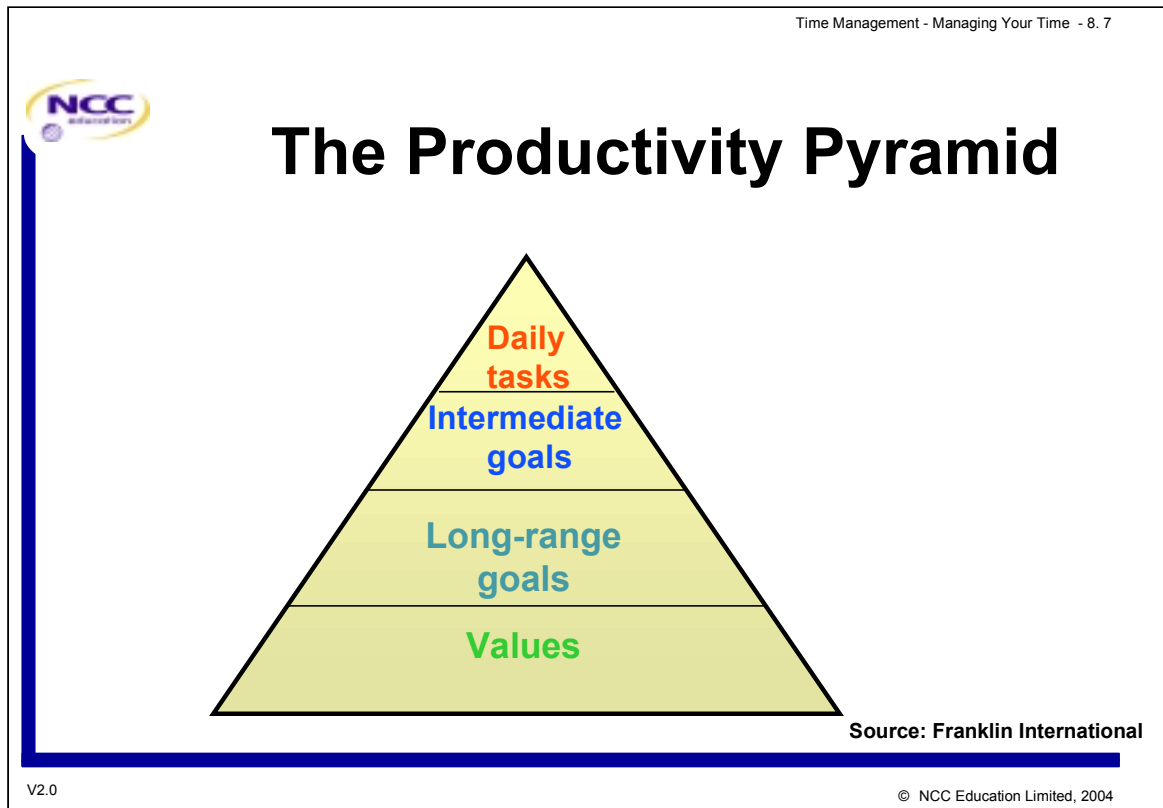
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Keeping a reliable and precise record of forthcoming events, appointments and obligations is crucial for efficient time management. There are many different types of planner available, so shop around to find the one that suits your needs best.

Remember only to have **ONE SINGLE MASTER SOURCE!**

The traditional way to record future plans by hand is in a diary. Increasingly sophisticated personal planners and electronic organisers with address books and accounting systems are now available, and are useful for keeping information to hand.

What effect does it have when someone other than yourself is responsible for the upkeep of your diary? How could this be achieved without causing conflict?



Ideally, everything you do should relate to your personal values. Visualising this relationship will help to improve your enthusiasm and effective use of time.

The goals that you set should not constrain you – rather be used to direct you and channel your life's activities into perspective.

To optimise your effectiveness, you'll need to expand your perspective to see your work activities in a broad context. That perspective will allow you to distinguish between activities that contribute to your effectiveness and those that should be delegated or eliminated.

Expanding your perspective is a matter of reviewing in your mind what your work is all about. How does each activity relate to your major goals and priorities? What tasks really matter in your department, your company, your industry? You should give highest priority to activities that:

- matter most to your department, company, industry and customers; *and*
- follow from your vision and contribute most toward the attainment of your main goals.



Setting and Balancing Goals

**Short-term
professional
goals**

**Long-term
professional
goals**

**Short-term
personal
goals**

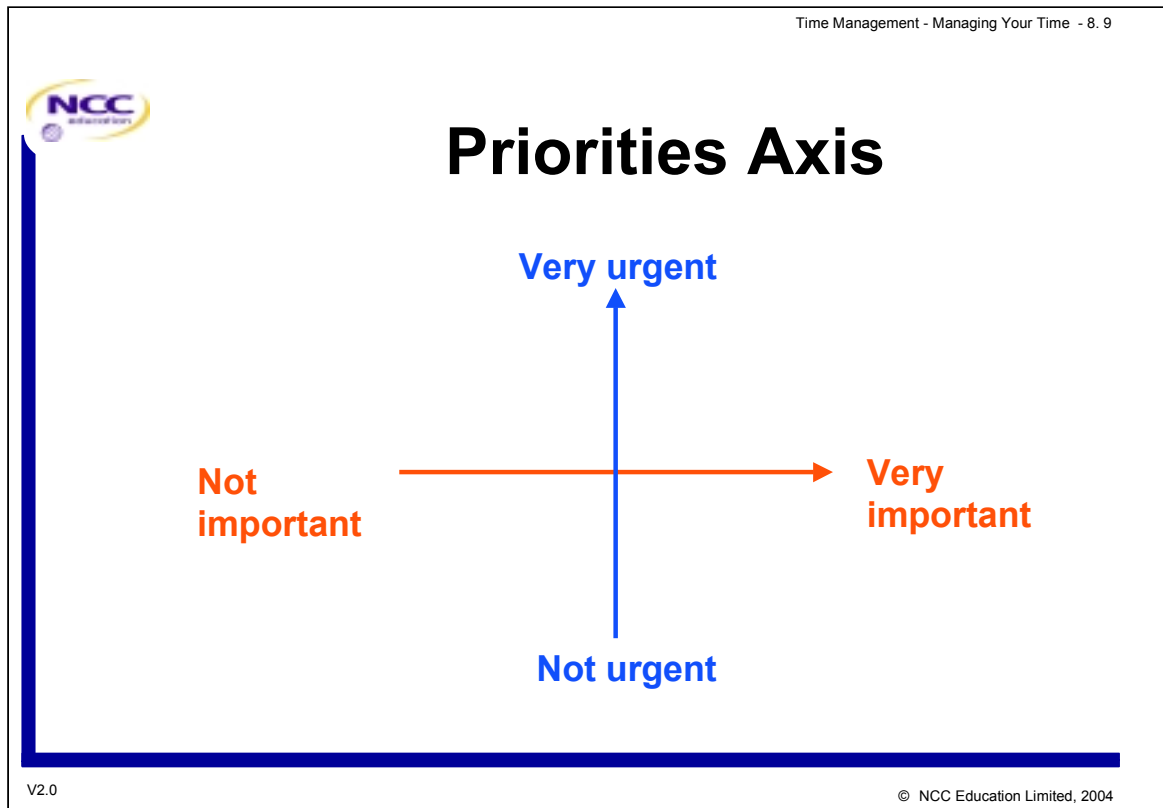
**Long-term
personal
goals**



Long term personal and professional goals are essential when it comes to setting overall targets, but in the short term a personal goal, such as starting a family, may take temporary precedence over long-term aims such as running a business.

The lecturer should encourage the students to document their goals in each of the four dimensions shown in the visual, giving skills required where not already present. Finally a timetable should be set stating when the students would like to achieve each of their goals.

Use of flowcharting techniques could be made – especially when planning career related goals – as this will help identify short and long term options, and the values placed on the different goals.



In order to work out priorities, it is essential to understand the distinction between importance and urgency, and to use both dimensions when assessing when a task should be undertaken.

Chart on the above graph, all the tasks that you documented in your assessment of a typical day at the beginning of the session. Then, develop a current to do list and plot each of these items on a separate graph.

Remember that the priorities of the different stakeholders in your tasks may not be the same as your own – and you may need to consult with all the stakeholders before plotting the tasks on the graph.

The top-right hand quadrant should obviously be allocated the highest priority.

The top-left hand and bottom right-hand quadrants may be where there is the greatest conflict, and input from other stakeholders may be required.

The bottom left-hand quadrant tasks should be performed last, if indeed they are needed at all.



Too Much Paperwork


A TON of paperwork does cross your desk!

- **Reduce the excess**
 - with electronic paper, colour coding, visual organisation
- **Do not aim for the unachievable 'paperless office'**

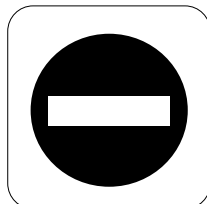


A survey (1992) in the United States claimed that:

- the US uses 22.8 million tons of office paper annually, which amounts to over one ton for every executive, administrator and manager in the work force;
- demand for office paper has grown twice as fast as the gross national product for the last 10 years;
- over 60 billion pieces of third-class or junk mail weighing 4 million tons are sent each year, amounting to 41 pounds for each adult American;
- the best way to handle paperwork is to eliminate the need for it altogether (convert it where appropriate and possible into electronic paper; where not appropriate or possible, ensure that it is quickly categorised, colour coded and filed);
- the aim should not be for a *paperless office*, because that worn-out notion misses the point (today's office needs a variety of information media, including paper; it is time office workers put paper in its place and turned to electronic media for many, if not most, information needs).

Time Management - Managing Your Time - 8. 11



Avoiding Interruptions



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Assess source of interruption – how many interruptions are made by whom, and using what media?

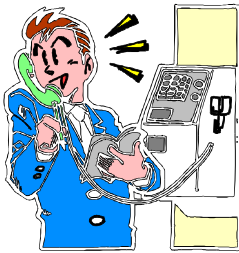
Assess how much the telephone interrupts. How many:

- unexpected calls received?
- unwanted calls received?
- calls lasted longer than necessary?
- calls could have been dealt with by someone else?
- calls interrupted me?
- calls could have been screened out?

Rethink workspace to make your desk less inviting. When you do not wish to be disturbed, do not sit down if you are followed into your office.



Managing Outgoing Calls



- **Plan calls as if attending a meeting**
- **Make outgoing calls in blocks**
- **Prioritise calls**
- **Set limits on duration of each call**
- **Collect relevant documents before the call**
- **Summarise discussions before end of call**

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There is hardly a business in existence that does not depend on the phone and, increasingly, voice mail for rapid and direct communications.

Set aside a specific time of day for making phone calls, and list all the calls that you need to make. Be clear about the purpose of each call, and draw up a brief agenda for each as if the call was a meeting, and then make sure that you cover all the items on the agenda during the conversation. Prioritise your calls in order of importance to ensure that you concentrate your time and resources on the most important and urgent calls.

Ensure that any use of voice mail is made appropriately. Voice mail is an ideal tool for arranging internal meetings or eliciting a simple response from a busy colleague. However, avoid bargaining or making deals by means of seemingly endless series of voice mail messages, since you need to speak directly to customers and suppliers to gauge reactions and find areas of compromise and agreement.



Managing Incoming Calls



I'm sorry, if you don't mind, I'll have to hurry you, the building is on fire and the flames are licking at my desk

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Techniques for managing incoming calls include:

- Put phone on divert when busy or in meetings.
- Set aside a quiet hour during which we will not take calls.
- Arrange for calls to be screened whenever possible.
- Make appropriate use of telephone messaging services (always make sure that your personal message is up to date).
- Be polite and brief with unwanted callers.
- Ask people to call at particular times when we are less busy.
- Avoid taking notes on loose bits of paper.
- Avoid tackling peripheral tasks while on the phone.
- Ask the receptionist not to give out names to cold callers.
- Make a list of excuses for keeping calls short.



Too Much to Learn?

Step 1 Assess your learning style?

Step 2 Use appropriate strategies to help you learn

Step 3 Learn collaboratively

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Although this will be addressed again in the mentoring section of this module, it is worth discussing this briefly now.

An introduction to information chunking and visualising techniques to assist in memory recall and conceptual understanding may also be of interest.

Structuring the information so it will fit into the *bigger picture* and then generating analogies for each new item, should also assist in the students ability to learn.

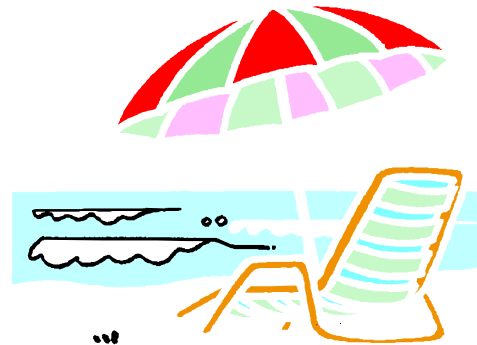
Peter Senge, author of *The Fifth Discipline* believes that team learning is a vital element of the modern organisation. He recommends:

- *Assess the needs and capabilities of the individuals.*
- *Establish the goals as a team.*
- *Discuss ideas, ask questions and provide feedback to others in the team.*



Scheduling Time Off

- Do not forget to eat and drink!
- Take daily breaks
- Take time for yourself and your family
- Take regular holidays
- **Do not feel guilty!**



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Managing your time successfully involves more than just organising your workload. Work will suffer if you do not schedule regular breaks to recharge your batteries.

Some business leaders include a regular period in their day when they briefly take time off. Similar to the siesta, it is often taken after lunch. Their doors are shut to interruptions, allowing them to take a short period of semi-sleep (only about 10 minutes), which has a recuperative effect on the body.

Exercise helps to reduce stress and can provide a useful break from work if your workplace has showers and changing facilities.

Regard holidays and time off work as a good exercise in delegation to colleagues.

Taking time off should not make you feel guilty – it will help you be more effective in your work.

Prepare an action plan on how you are going to make more effective use of your time (referring back to the self-assessments done at the beginning of the session). Revisit this subject in a few weeks' time to review the success or otherwise of the implementation of those action plans.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 9 Time Management - Managing Meetings

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As meetings consume a large proportion of the average working week, this session is dedicated to looking at the issues of meetings and how to make effective use of them.

Discussions will include items such as:

- Why do meetings go wrong?
- What to do before meetings?
- What to do during meetings?
- What to do after meetings?

Checklists can be very useful when chairing and attending meetings - the students should be encouraged to develop their own checklists for improving their own performance in meetings.

The session should also be supplemented with a series of meetings around a theme from elsewhere in the course, giving each student the opportunity to organise and chair at least one meeting.



Why Have Meetings?



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Brainstorm the various reasons and objectives for holding meetings and the different types of meetings that occur in business.

Answers could include:

- Transfer information and receive feedback.
- Generate new ideas.
- Build consensus for a decision or course of action.
- Combine expertise to solve problems.

Different types of meeting include:

- One to one discussion, interview or performance assessment.
- Project progress meetings.
- Team briefings.
- Document or product review meetings.
- Budget setting meetings.
- Board meetings.
- Conferences.

Consider the proportion of your time which is spent in meetings.

Time Management - Managing Meetings - 9.3



Why Do Meetings Go Wrong?



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Now consider what proportion of that time spent in meetings is wasted.

Explore the following areas:

- How much did the meetings cost?
- Were the costs of attending the meetings greater than the benefits gained?
- Were the meetings adequately planned?
- How many meetings were delayed because of late-comers?
- Did the meetings frequently last longer than expected?
- Were there problems with equipment and facilities?
- Did each participant make worthwhile contributions?
- Did the meetings tend to wander away from the objectives?
- Were decisions taken during the meeting followed up?
- Any other pitfalls identified?

Explore some real cases where the students are able to provide scenarios to fit the above.



Before the Meeting - Chair

Be clear on

- What are the alternatives to a meeting?
- The meeting's purpose?
- The meeting pay-off?

Prepare the agenda

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The chairperson should work from a *standard* checklist to ensure that all meetings are coordinated and run effectively. It could include:

- Is the meeting really necessary?
- What are the alternatives to meeting face to face?
- What are the objectives of the meeting?
- Who is needed to ensure that these objectives are achieved?
- What will be the pay-off from achieving the objectives?
- What will the meeting cost?
- What equipment/facilities are needed for the meeting?
- If an agenda is required has it been prepared/distributed?
- Are all the attendees clear about the start time and the location of the meeting?
- Have attendees received all the relevant background information?
- Do all the participants need to be present for the whole meeting?

Once the purpose and objectives of the meeting are defined, we need to ask what the pay-off from achieving each objective will be. The pay-offs will enable us to prioritise the agenda and focus on the important items. The total meeting pay-off should be weighed against the meeting cost to see if it is a worthwhile exercise.

The agenda items should be positive and achievement oriented, i.e., "To find a solution to the distribution problem", rather than "To discuss distribution problems"



Before the Meeting - Attendee

- **Evaluate necessity to attend**
- **Be prepared**

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A checklist can also be useful to the meeting attendees.

It could look like:

- Do I really need to attend the meeting?
- Is there an alternative to the meeting?
- Am I sure of the correct time/location of the meeting?
- Have I arranged my schedule so that I will get to the meeting on time?
- What do I want to contribute to the meeting?
- What do I want to get out of the meeting?
- What background paperwork do I need to tackle?
- Do I need to attend all of the meeting or just part of it?



During the Meeting - Chair

Deal with

- Late-comers
- Hidden agendas
- Rambling discussions
- Low participation
- Interruptions
- Arguments
- Group indecisiveness



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The chair has a difficult job, not only to see that objectives of the meeting are achieved and followed through, but also to ensure that any destructive forces are kept to a minimum and dealt with appropriately.

In addition to developing a checklist for the chairperson, a discussion should be held as to how to deal with these listed destructive elements.

The checklist could include:

- Always start on time.
- Set out the objectives of the meeting.
- Stay positive throughout the meeting.
- Follow up actions from the last meeting.
- Decide who will take the minutes.
- Encourage participation from reserved attendees.
- Silence sidetrackers.
- Keep the discussion focussed on the agenda.
- Adhere strictly to the agenda timetable.
- Summarise decisions/actions to be taken as the meeting progresses, and again at the end.
- Ensure that all the items on the agenda are covered.
- Finish the meeting on time.



During the Meeting - Attendee

- **Be constructive**
- **Do not waste time**



As participants at meetings, we should always try to be constructive. If we act counter-productively, we are wasting our own time as well as that of the other participants.

The attendee's checklist may look something like the following:

- Contribute constructively to the meeting.
- Restrict contributions to agenda items.
- Focus on the meeting objectives.
- Be clear about any follow-up actions or steps to take.
- Avoid private discussions during the meeting.



After the Meeting - Chair

Ensure appropriate close-out of issues raised



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What happens after the meeting, ultimately determines whether or not the meeting has been a success.

As soon as the meeting is over, the chairperson should quickly work through his checklist. In certain circumstances, it can be useful to evaluate the meeting with the participants.

The *close-out* checklist for the chairperson could include:

- Has the meeting been a success?
- Were the right participants present?
- Were all the items on the agenda covered?
- How should unfinished items be dealt with?
- Do I need to distribute meeting minutes - and who to?
- What should I do differently next time?
- Could we have achieved the same results without a meeting?



After the Meeting - Attendee

**Transfer actions to
“To Do” list**



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After the meeting, the attendees should immediately transfer actions to their to do lists, and run down their own checklist.

Such a checklist could include:

- Was my participation in the meeting really necessary?
- Am I clear about any follow-up actions I need to take?
- Did I contribute constructively to the meeting?
- What should I do differently next time?



Managing Meetings - Summary



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All the theory regarding managing meetings is of no use if the students are not able to practise this theory.

Therefore, it is strongly recommended that a series of meetings be established whereby the students each have a chance to chair a meeting.

Introducing some of the destructive elements using role play techniques will also enable the students to practise dealing with difficult scenarios.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 10 Time Management - Managing the Time of Others

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To make the best use of your time, you also have to manage that of your staff, colleagues and seniors. Learn to delegate well, share tasks and manage upwards as well as downwards.

Delegation is the art of getting things done through others. As we progress through our careers, we will find it necessary to rely more and more on our colleagues to get things done for us. Many managers fear delegation and the loss of control it brings, but it is essential to free up our own time for higher pay-off activities.

In this session we will study issues specifically relating to delegation, but include pointers and extracts from elsewhere in the course, as this topic requires the use of skills that are discussed in many of the other sessions. These include human communications, estimation, progress monitoring, managing meetings and handling interruptions.



Communicating Well

- **Maintain high expectations - and people will live up to them**
- **Be aware of cultural differences**
- **Persuade others of your case using facts, not emotions**
- **Hearing is NOT the same as listening**

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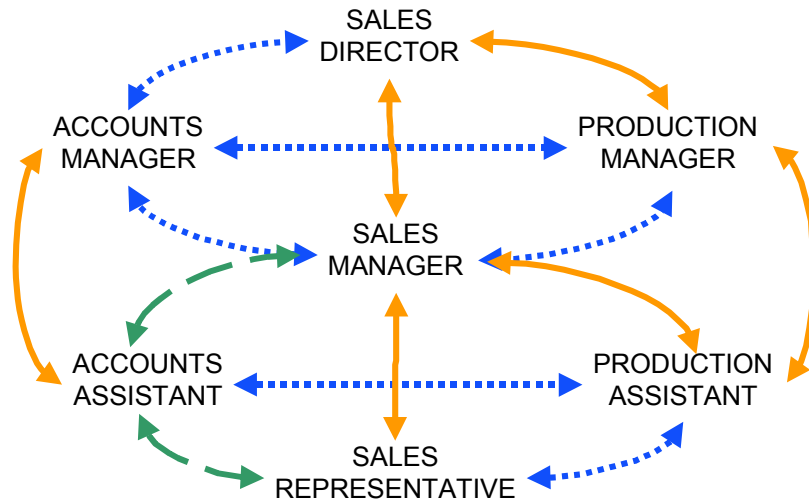
To manage others so that you all make the best use of available time, you first need to master the art of communication. This is not just a matter of deciding what your message is; it is also about deciding how to communicate that message.

Intranets and email systems allow rapid widespread dissemination of information. They can also make working at home without losing touch with colleagues a more practical and attractive option than it used to be. However, beware of information overload: the volume of data may make what is effectively junk email seem more important than it is, and the ease of electronic communication can make it tempting to send messages that are not strictly necessary.

Remember too that as organisations become less hierarchical, and lines of communication open out, recipients may lack necessary background information, so always be clear and precise to avoid time-wasting misunderstandings.



Understand Information Flow



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Certain communication lines in any organisation are better developed than others. For instance sales staff spend more time in contact with the production department than with colleagues in administration.

On the above diagram:

- the orange connectors (continuous line) indicate frequent communication
- the blue connectors (dotted line) indicate occasional communication
- the green connectors (dashed line) indicate rare communication.



Understanding Delegation - 1

Advantages

- Free part of your time
- Develop subordinates' capabilities
- New ideas and approaches
- Build morale within the team



A clear and straightforward definition of delegation is:

- It is the process of passing certain tasks and duties from one person to another, typically a superior to a subordinate. The delegate receives sufficient authority to complete the work satisfactorily, although the delegator retains overall responsibility for its success or failure.

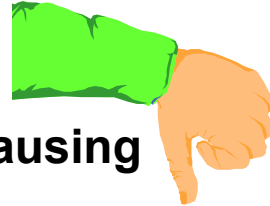
Obviously, delegating work to others will free part of your time, so allowing you to concentrate your skills and efforts on more urgent or important matters. It should also develop your subordinates' capabilities, increasing their confidence and stature, and providing greater job satisfaction. New ideas and approaches to old methods may be found too. It can build morale and motivate everyone within the team, if they know that you are willing to give them room to grow, be more successful and progress through their careers.



Understanding Delegation - 2

Disadvantages or potential problems

- Delegator hands over work but not authority
- Fear of letting go
- Dull tasks being delegated - causing resentment



Most of the drawbacks of delegation arise simply because it is not done wholeheartedly or properly. Most notably, the delegator hands over work but not authority, because he or she is frightened of letting go. Perhaps he or she will not be needed any more. Possibly, the delegate will do a faster and better job. So the delegator constantly interferes and checks what is being done, creating ill-feeling and wasting (two people's) time.

Often only the dullest or the most unpleasant tasks are passed on, which again causes resentment. Also the delegator sometimes chooses the wrong employees to do the work regardless of whether or not he or she is capable and willing.



Are You Delegating Well? - 1

- **Do you think your subordinates lack ability?**
- **Do you believe it is quicker to do everything yourself?**
- **Do you like to be seen as overworked?**
- **Are you reluctant to hand over tasks?**
- **Do you just pass on routine activities?**
- **Do you keep the most enjoyable tasks for yourself?**

What do the students believe the answers to the above questions should be?
Options are “Never”; “Sometimes”, “Often” and “Always”.



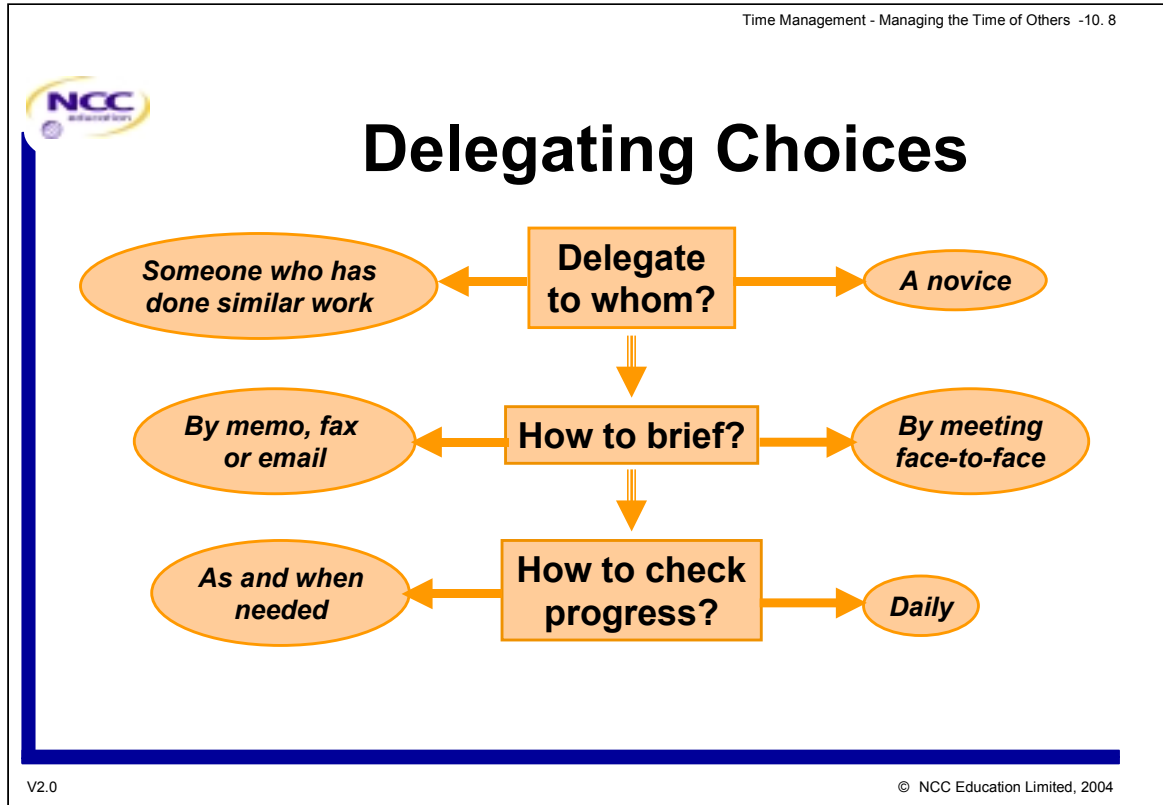
Are You Delegating Well? - 2

- Do you tell delegates to report back every step of the way?
- Do you continually check up on delegates?
- Do delegates ask you what they are supposed to be doing?
- Do delegates get angry with you?
- Do you have to complete the delegated activities yourself?

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What do the students believe the answers to the above questions should be?
Options are “Never”; “Sometimes”, “Often” and “Always”.



The process of delegation comprises the decision to delegate, the briefing and the follow-up. At each of these points, anticipate the potential problems.

- *The decision* – You will not benefit if you work to the assumption that it takes longer to teach somebody else to do a job than to do it yourself. You must persuade yourself to delegate. Delegation has its own rewards – once someone has learned to perform a particular task, they will be able to do it in the future without repeated briefings. However, be sure to delegate each job to a person with appropriate skills and knowledge – depending upon how much time you currently have to assist them in performing the task.
- *The briefing* – Make sure that the person to whom you are delegating clearly understands the brief – what you want them to do and by when. Offer ongoing support and guidance.
- *The follow-up* – During the course of the project, check the standard of work produced. Provide positive feedback, but beware of overdoing it – there is a narrow line between helpful supervision and debilitating interference.



Delegating - Key Points

- **Define objectives clearly**
- **Reserve some time for providing input and monitoring**
- **Set precise and realistic deadlines**
- **Reward good work generously - and chastise in moderation**

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In addition to providing a clear brief when delegating, you must provide all the information necessary for someone to complete the task successfully. To avoid any misinterpretation of the facts, take time to explain exactly what you expect, and how the task fits into your overall plan.

Try to obtain agreement on when the task will be completed, rather than imposing an unrealistic deadline. Request that one of the first actions undertaken is the delegate's own estimate and plan of completion of task – if necessary providing guidance on how to estimate effort, duration and do the detailed planning.

Ensure that any feedback given is positive, even if problems have occurred. If problems persist, then encourage the delegate to undertake further professional development and organise training sessions.



Managing Colleagues

- **Do not allow colleagues to distract you with unimportant issues**
- **Focus on objectives**
- **Encourage opinions**
- **Set aside times when your office is open to all**



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One of the most difficult things to get right is managing interruptions from colleagues. Either you become too available to each other, in which case you lose control of your time, or you are too distant and fail to take advantage of each other's abilities.

Traditional corporate hierarchies are gradually being flattened, and more tasks are now being assigned to teams designed and brought together for one-off projects. This means that you need to be able to work side-by-side with a variety of individuals and find ways of agreeing with them about work priorities and time management.

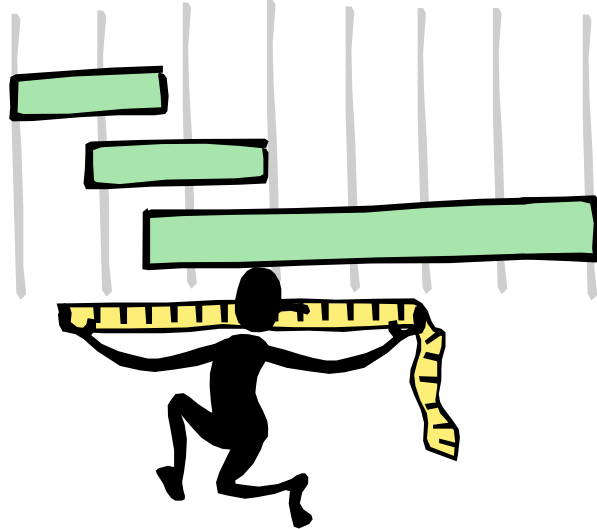
A good time-saving habit for you and your colleagues to get into is always to ask yourselves what you expect when you meet to discuss an issue. A useful mnemonic – AID – helps in classifying the options available to you. Is it *Advice* you need from each other, is it *Information*, or is it a *Decision*? At the beginning of a discussion, indicate exactly what you are looking for from each other and you will all be more aware of the demands that the exchange will make on your time.

The unique thing about most colleagues is that they can give you dispassionate, on-the-job feedback, which you often cannot get from further up or lower down the organisational hierarchy. Unlike colleagues, seniors and subordinates may think too much in terms of job assessments. Listen to their advice, and adopt any useful time-saving techniques.

Time Management - Managing the Time of Others -10. 11



Share Your Time Management Skills



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Share your time management skills with your colleagues.

Prioritise work:

- Talk through the principles of dividing work into high, medium and low priority tasks.
- Use examples from your colleagues' workload.

Using diaries and planners:

- Ask your colleagues to keep a time log, then review and analyse it with them to discover their various working patterns.
- Help your colleagues to set up an appropriate planning system.

Filtering information:

- Encourage your colleagues to assess every item of information they receive to decide what action is required.
- Provide hints on faster reading based on your own experience.

Delegating and following up:

- Discuss specific, related examples from the past to determine the best course of action in this instance.
- Be prepared to review any new systems that are set up.



Managing Your Manager

- **Build a relationship**
- **Communicate efficiently**
- **Know when to offer advice**



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Everyone should know how to manage their managers if they want to be able to make the best possible use of their own time. Learn to do this discreetly so that your seniors do not feel as though they are being undermined or manipulated.

When needing to offer advice – remember the AID mnemonic from the previous visual! It is often possible to influence your boss to make a different decision to the one he or she was going to make. Remember though that there may be reasons behind a decision of which you are unaware.



Summary



Remember that time is perfectly democratic. Nobody has more or less of it than you!

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This culminates the three sessions on Time Management:

- Managing Your Time.
- Managing Meetings.
- Managing the Time of Others.

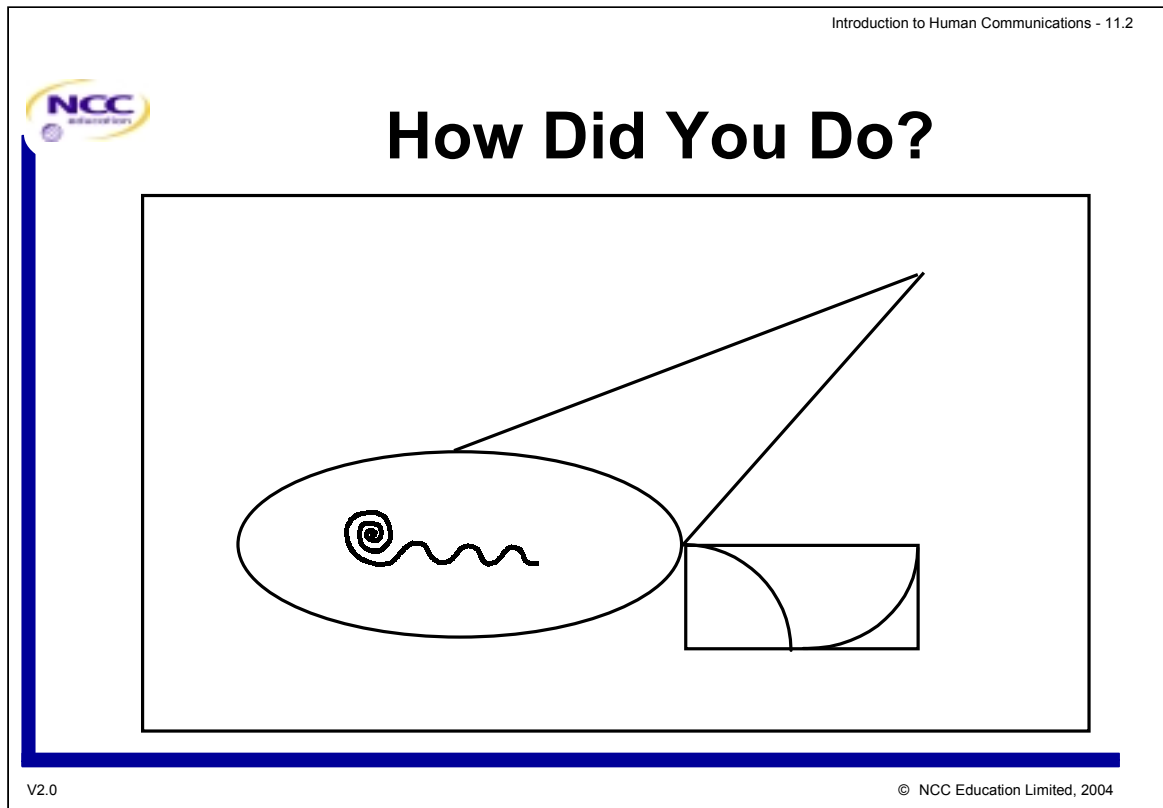
Remember the adage stated in the visual and try not to waste anyone's time – least of all your own.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 11 Introduction to Human Communications



The ability to communicate effectively is an essential part of being an IT Professional. Good communication skills are needed for many tasks including eliciting requirements for systems, briefing team members, demonstrating products, presenting to prospective clients, interviewing for staff.

This series of sessions on Principles of Human Communications cover all the above topics, and include an important core competence required for all of them – *listening*. It is recommended that throughout all these sessions, time is set aside for *practice listening*, where the students in groups of three (talker, listener and observer) take turns to listen to each other talk for five minutes on a topic of their own choice:

- The listener should be able to recount the important points made (without taking notes).
- The talker should comment on whether they had been attended to.
- The observer is able to provide comment on the interaction, and listening techniques used.

See the details of the listening in the next session – but don't wait for the next session before trying this exercise.

The book, *Interpersonal Skills – Goal Directed Behaviour at Work*, by John Hayes ISBN 0-04-445-550-3 accompanies these sessions.



Objectives of Communication

To be received

To be understood

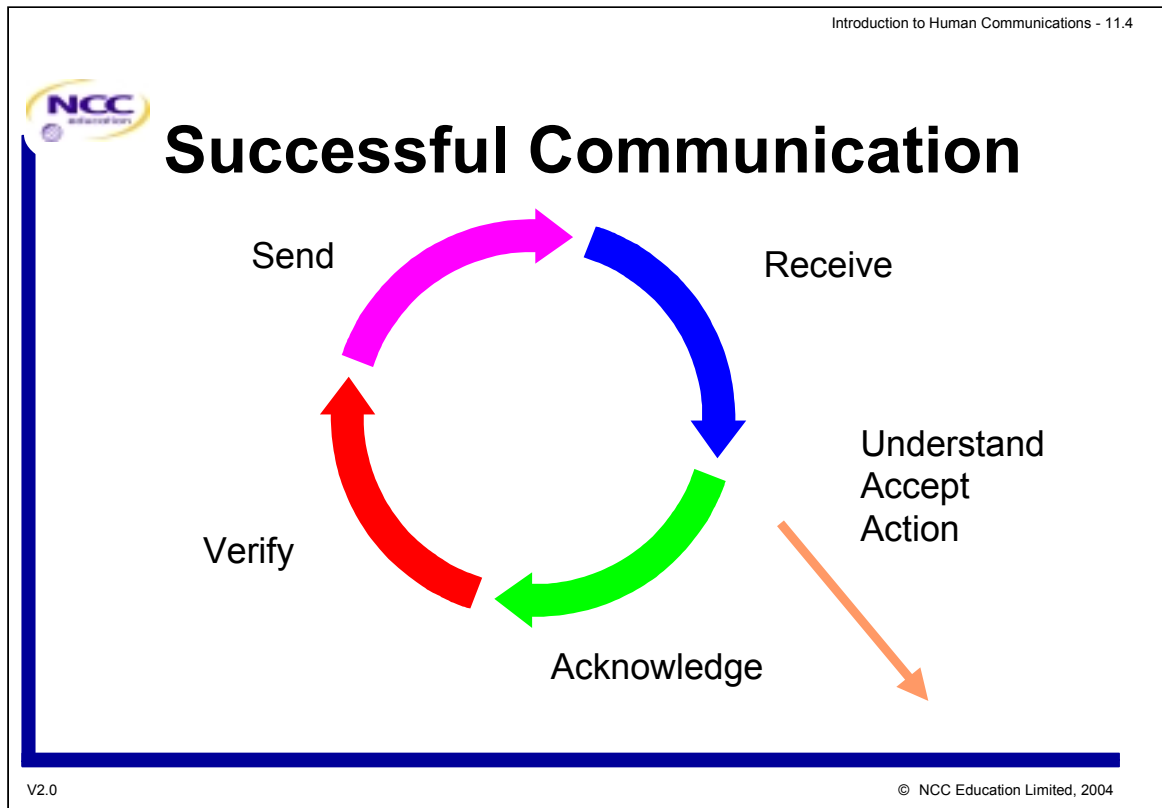
To be accepted

To get action

When communicating, it is important to recognise why you are doing so. If there is no reason, then it is likely you are wasting time.

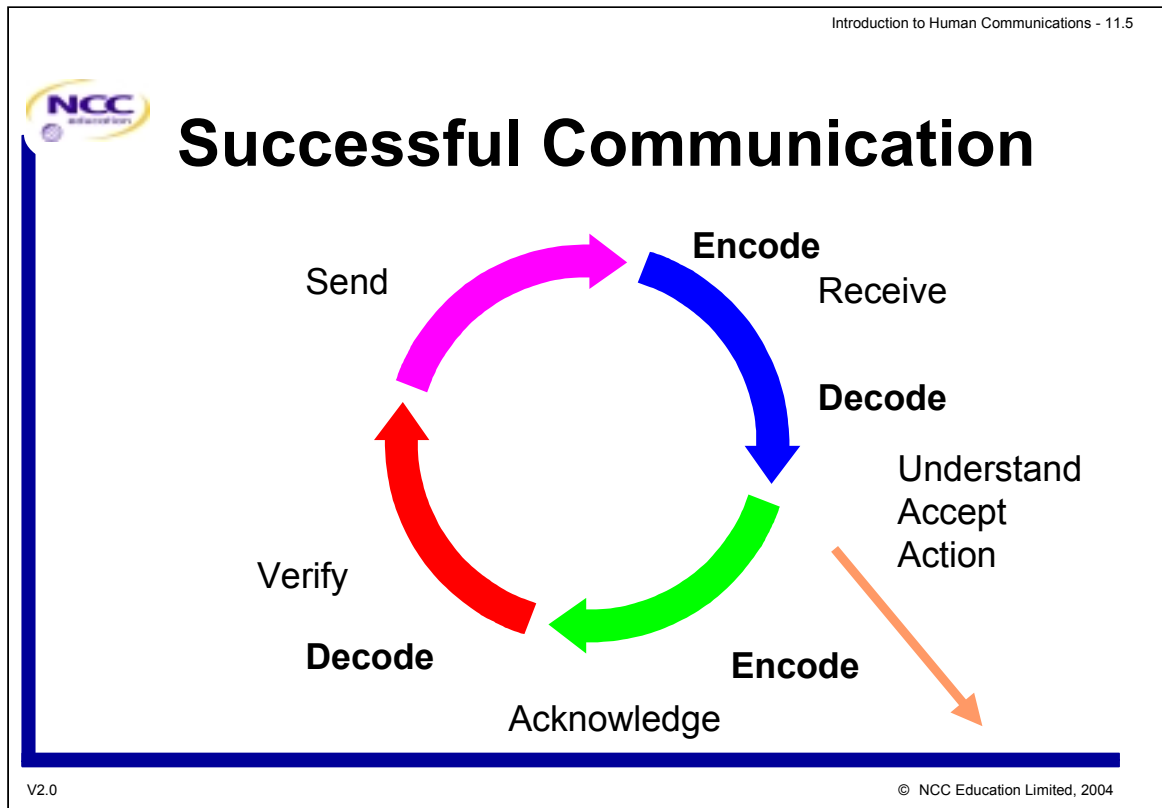
All communication is targeted at four objectives. These are:

- If a message is not *received* all subsequent actions can not be followed.
- A message must be *understandable* in the context in which it is given.
- After being understood, the message must be *accepted*.
- All messages should provoke an *action*, even if this is only feedback that a piece of information has been understood by the recipient.



This cycle of activities is often used to describe the process of communication indicating we send a message, which the recipient receives, and as well as understanding, accepting and performing any action required, also completes the cycle with some form of acknowledgement which provides verification that the communication has been successful.

This however is a simplification, and it is that simplification which cloaks the difficulty in communication that we must overcome if our communications are truly to be successful.

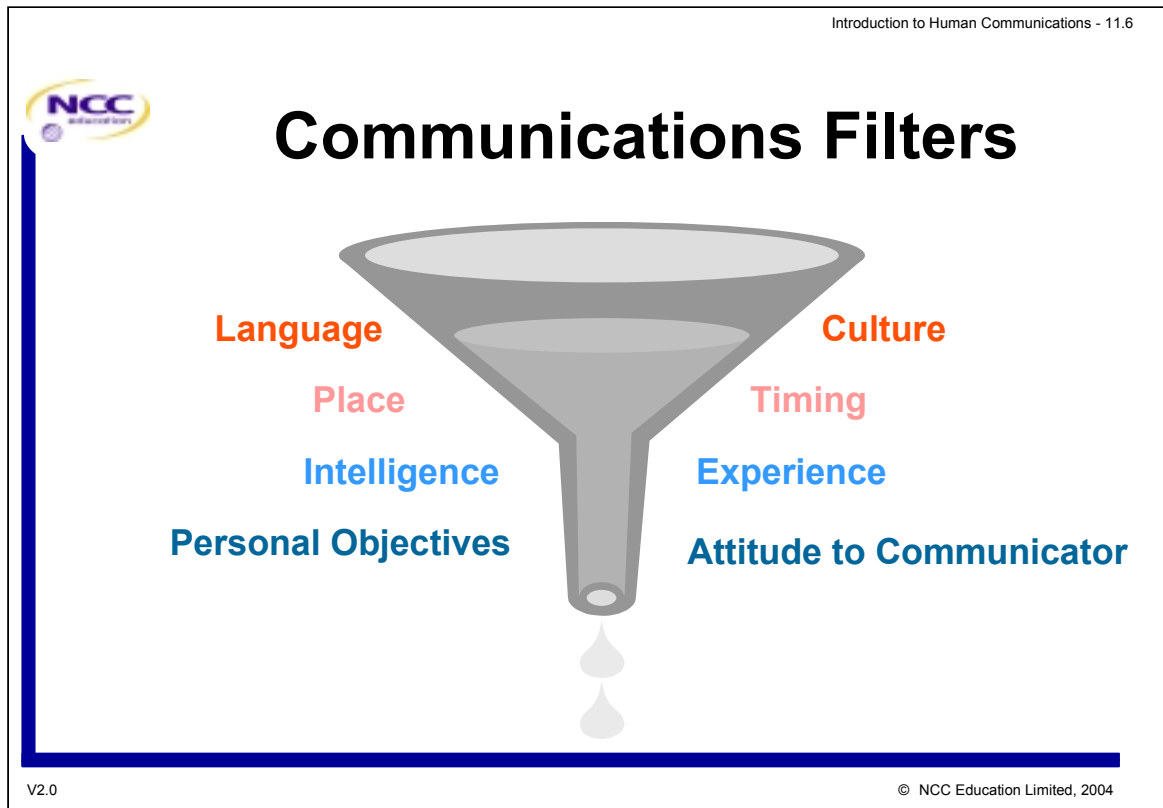


As we can see from this amended diagram, as each person involved attempts to send a message they must first encode the message in the medium they have chosen (verbal, written, body language etc). Similarly each receiver must decode the message prior to attempting to understand the message.

Likewise, the acknowledgement is first encoded by the receiver, before being transmitted to the sender for decoding.

It is within these encoding and decoding sequences that many problems with communication occur. The coding is often performed through filters which are context and environment dependent.

Later in the session there will be a discussion comparing the positive and negative aspects of communication via various media, e.g. direct speech, telephone, physical letter, email.



Any one of these filters could affect and potentially alter the meaning of a message as it is received.

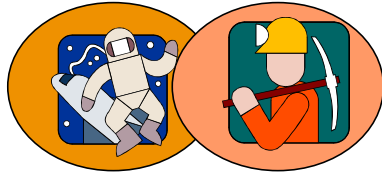
It is important that the communicator is aware of the potential pitfalls, and makes appropriate amendments to the content and medium of the message.

Experience, language and culture are examined on the next three visuals. It may be worth exploring the other filters by looking at each in turn, and seeing what action the sender of the message may take in order to counteract any detrimental effect on the intended message content.

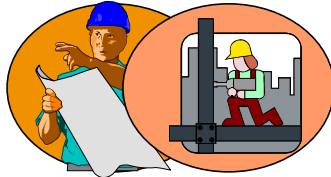
OK?



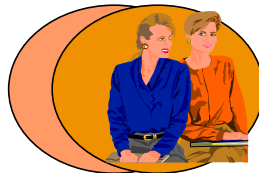
Experience Filters



Little shared experience



Average shared experience




Much shared experience

When we have a high level of shared experience we have a common understanding of the meaning of words, so jargon words have their special meaning for both the sender and the receiver. The less shared experience the smaller the zone in which we can communicate effectively. As long as we recognise the danger, it is not too difficult to manage it. However problems arise when assumptions are made.

In an IT context the client, say an accountant, assumes that we understand income tax legislation and that we understand his requirements. We, as the IT professional, are often too afraid to demonstrate our ignorance by asking for clarification. This also applies in reverse. In order to perform the acknowledge process, we translate the system into *computer design* jargon and present this back to the client, expecting him to understand a description of his system expressed in a language suited for the next level of design decomposition. The client again is often afraid to demonstrate ignorance, and hence errors occur.

Introduction to Human Communications - 11.8



Language Filters

Check

Shrimp

Hood

Trunk

Crisps

Lift

Football

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By language we are not referring to the difference between English, Chinese, Malaysian or whatever, but to that which is often a subtle and more insidious difference. These differences occur when we think we understand the other person, but in fact our experiences differ to an extent that my understanding of a word is significantly different from the next persons. Consider one word, *smack*:

In the context of the Oxford English Dictionary a smack is either a slap, to have a flavour of something or a single-masted boat and we would decide which one from the context in which we met the word.

However it is also a street slang word for a type of drug, so if one were involved in drug culture in any way one might interpret the word in this context.

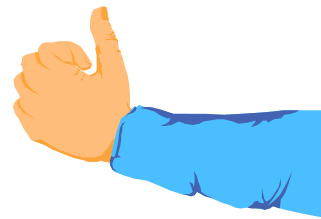
One further example, an American might ask for the check and pay it with some bills, while a Britain might ask for the bill and pay with a cheque. In both cases the person is determining how much something costs and is paying for it. Both are speaking (*actually, they only think they are speaking*) a common language, English.

Each of the words on the visual has at least two meanings which differ in England and America. How would you interpret them?



Cultural Filters

- Shaking the head
- Eye contact
- Yes
- Thumbs up
- Holding hands



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Consider some of the following examples at the cultural level:

- Shaking of the head:
 - In most western cultures the shaking of the head from side to side is, almost universally, interpreted as no. However in some other cultures the same movement means yes. This only causes a problem for the poor unsuspecting western course tutor who doesn't recognise this and repeats because he interprets the no as the audience not understanding.
- Eye contact:
 - In some cultures maintaining eye contact is normal, in others it is extremely bad manners.
- Yes:
 - In some languages, the word for NO sounds very much like YES.
- Holding hands:
 - In some cultures men holding hands in public is normal, in others it takes on a sexual connotation and can be seen as provocative.



Medium

Written

- letter
- fax
- email
- report
- manual
- Inter/Intra/Extranet

Verbal

- face-to-face
- telephone
- teleconference
- presentation
- audio/video tape

With current technology, there is an ever-increasing choice of medium for the transmission of the message, each with properties which make it appropriate for a given set of circumstances.

Make a list of three advantages and three disadvantages relating to each of the media listed on the visual.

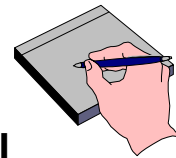


Which Medium?

- Fast
- Informal
- Fast verification
- Instant feedback
- Lower importance
- Impermanence



- Slow
- Complex ideas
- Formal
- Recorded
- Repeatable
- Easy to control
- Greater importance
- Permanence



The lists produced by students should reflect the various aspects listed on the visual, although some of them will be more significant than others – for instance, a complex idea may be helped by a face-to-face opportunity for questioning and interaction; a verbal presentation given on videotape will not allow feedback; it is arguable that email can offer most of the speed and other advantages of a verbal message, *etc.*

The question of accuracy, in terms of completion of the communications cycle, is complex. Written communication can be revised and validated before and after transmission, whereas verbal communication is immediate and often spontaneous, and thus much harder to validate. However the instant opportunity for feedback offered by verbal transmission means that the accuracy of its reception can be checked immediately and errors corrected straightaway; it may take a considerable time to feed back understanding in written communications, with the result that errors may not be corrected until too late.

Introduction to Human Communications - 11.12



Audience



How much do we know about them?

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By far the single most important *critical success factor* in human communication is simply *knowledge of the audience*. Whether this is a single person or a group, the sender can never know too much about the receiver.


- Are they all alike or mixed?
- What do they:
 - already know?
 - want to know?
 - need to know?
- What are their attitudes to:
 - subject?
 - communicator?
- In what context is the information received?
- What are their priorities?

Based on the answers to these questions we will decide on the language and medium to use. It could be a mixture of both written and verbal to combine benefits of both.


We will also decide the method for communication and the environment in which we want to deliver the message. For example, will we just talk loudly in an open plan office – or set up a lecture theatre; and how will we organise the seating in the room if we are going to do a presentation?

Introduction to Human Communications - 11.13


Audience Types




Activist



Pragmatist



Theorist



Reflector

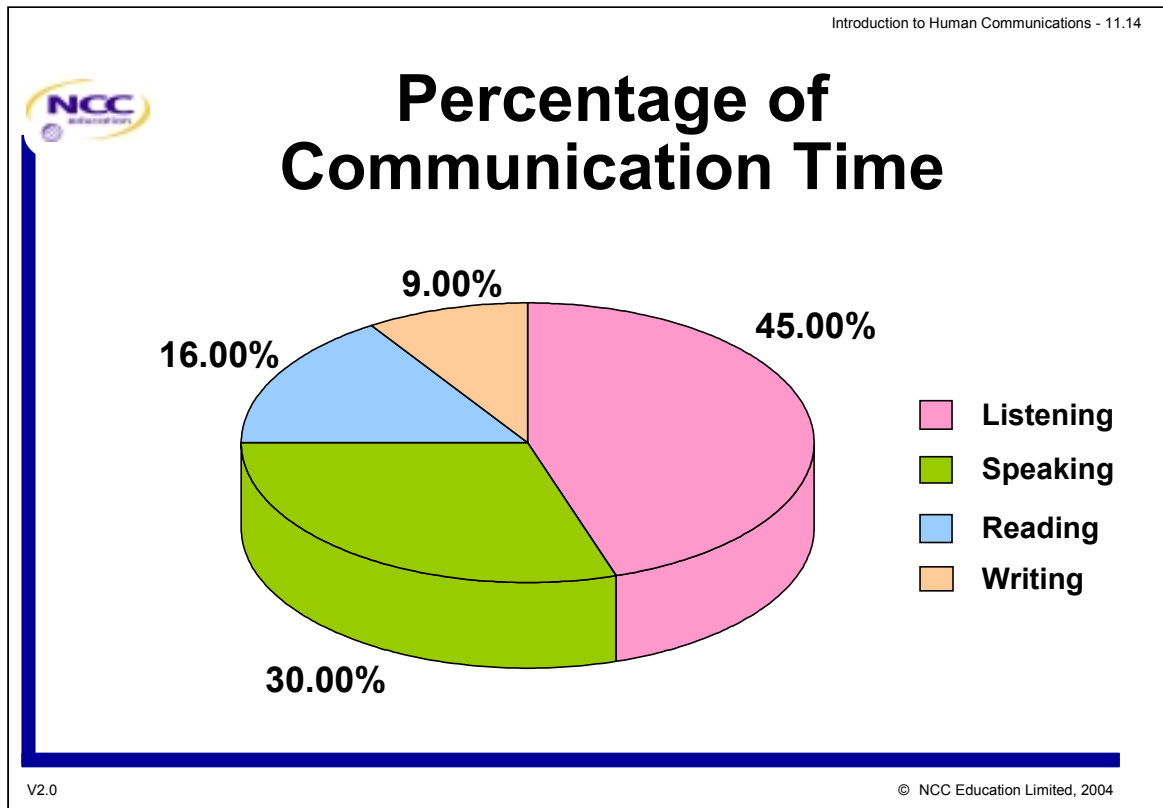
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Audiences are not always hostile or reluctant to receive a message – but if the sender consistently refuses to take care to make sure that the communication method and medium are appropriate, they will soon become so!

Different people exhibit a range of preferences in terms of the way they receive messages. Broadly speaking, there are four types of receiver preference, and each communication should be targeted to address these preferences. If necessary, this could mean that the message has to be communicated differently to different people.

This will be revisited in the Introduction to Human Behaviour session under 'Preferred Learning Style'.

Students should think about which type, from the above visual, they believe themselves to be.



As we can see from this visual, good communication is a two-way process, and it would be true to say that a person will never be a good communicator unless he/she is also a good listener.

The importance of this is reinforced by the figures shown; nearly half of communication time is spent listening, and this is by far the biggest percentage of the means by which information is received. It is therefore necessary to strive to improve these receiving skills whenever possible.



Receiving Communication (Listening/Reading)

- Find areas of mutual interest
- Ignore “political correctness”
- Hold your fire
- Listen for ideas
- Hear the sender’s language
- Work at it....
- Judge content not delivery
- Be flexible
- Use non-verbal observation
- Exercise your mind
- Resist distractions

... and listen to the silence

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Active listening – and active reading – means that the receiver should be just as aware of the barriers to communication as is the sender. Everything said earlier also applies to the receiver, who should accept a shared level of responsibility for good communication. (Although it is important that the sender does not see this as an opportunity to excuse a lack of care on his/her part.)

The key listening points made on the visual also need to be practised until they become second nature.

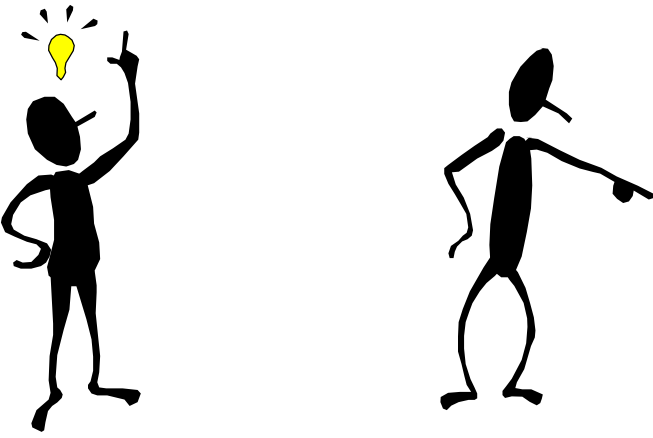
Listening to the silence is perhaps the most difficult task in this – but sometimes the things which are not said are just as important as those things which are.

This topic will be revisited in the session on Listening Skills. *Students should think about how they listen, and what percentage of their time is spent listening.*

Introduction to Human Communications - 11.16



Communication Dynamics



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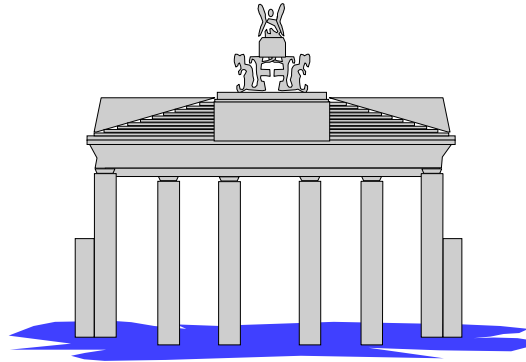
Communicating a message can often be more effective if you lead the recipient of the message to come to the conclusion himself – and that way obtaining *buy-in* to the concepts given, rather than giving a “thou shalt do” ultimatum type message.

A study of the transactional analysis material in Chapter 10 of the nominated book may be appropriate at this point. Transactional analysis is not expanded further during these sessions.



Barriers to Communication - 1

- Politics
- Stereotyping
- Lack of knowledge
- Lack of interest
- Bad expression



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Filters occur all the time, even when individuals wish to communicate effectively. Barriers, however, occur when there is often a subconscious wish NOT to communicate, or to receive a communication.

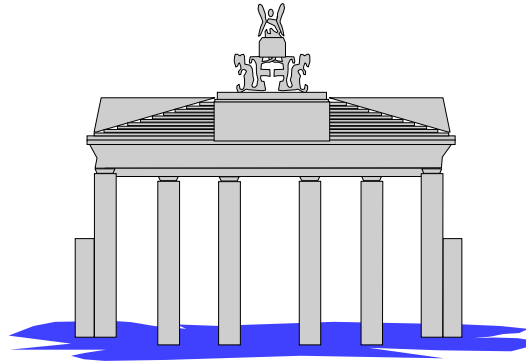
Some barriers are listed here:

- *Assumptions/stereotyping* – if the receiver has an opinion (either positive or negative) of the sender based on previous communications and the importance of previous messages, this will lead to assumptions that the next message will be at a similar level.
- *Inexperience/lack of knowledge* – when either of the parties has a significantly different level of knowledge or experience, mutual assumptions will be likely – and these will not necessarily be compatible.
- *Incompatible objectives* – when the overall objectives of the sender and receiver are not the same, unintentional misunderstanding will be probable – “a man hears what he wants to hear and disregards the rest”.
- *Attitude to the sender/lack of interest* – if the receiver does not see what benefit there is to him/her from receiving the message, or if they feel that the sender is unimportant or much less senior, they are not as likely to give the requisite level of importance to the message.



Barriers to Communication - 2

- Emotion
- Ability/personality
- Noise
- Redundancy



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- *Time/place/mood* – people do not exhibit consistent behaviour in terms of message reception – this will vary according to several factors such as time of day, the physical location of the reception, and certainly the mood of the receiver will govern his/her reaction to it.
- *Noise (cumulative loss)* – the more times a message is repeated, the more its content will degenerate and the original meaning be lost. This is reminiscent of the children's game '*Chinese Whispers*' where a sentence is whispered into one child's ear, and passed from child to child; at the end of the chain, the message will be found to have changed completely.
- *Overload/redundancy* – if too much information is transmitted, the receiver will be overloaded; particularly when the message contains much redundant information, the significant element may be disguised and lost.



Crisis Communication

DO

- Involve senior management
- Issue regular updates
- Tell the truth
- Demonstrate concern

DON'T

- Speculate in public
- Decline to answer
- Release confidential information
- Play favourites

Often when all the best practice goes out of the window – it is during a crisis scenario. In these circumstances it is worth highlighting a short simple set of DOs and DON'Ts that should be imprinted into the sub-conscious memory for automatic recall.



Preparation

Message

- What do I want to communicate?

Medium

- What is the most appropriate?

Method

- How to achieve this?

Murphy

- What can go wrong?

So to conclude this introductory session, it is important that students are now aware of the importance of preparation when undertaking a communication of any kind.

Planning and forethought can counteract many of the pitfalls that have been discussed.

- What is the message that is to be communicated?
- Should it be communicated verbally or in writing?
- Which communication method should I use?
- What are the potential problems and how am I going to minimise the risk of them affecting this communication?



The Most Helpful Slide

**I keep six honest serving men
They taught me all I knew
Their names are What? and Why? and When?
And How? and Where? and Who?**

Rudyard Kipling

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In summary:

- What do I need to communicate?
- Why do I need to communicate it?
- When do I need to communicate it?
- How do I need to communicate it?
- Where do I need to communicate it?
- Whom do I need to communicate it to?

The students should now be encouraged to assess their own communication skills, identifying their strengths and areas for improvement and then prepare an action plan on how they are going to continue to improve their skills through the remainder of their professional career.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 12 Human Communications - Listening Skills

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Listening is a core competence. People who cannot listen cannot relate.

Nichols and Stevens (1957) in *Are You Listening*, published by McGraw Hill, estimate that 45% of all communication time is spent listening compared with 30% speaking, 16% reading and 9% writing.

Despite the fact that people spend so much time listening, few ever receive any formal training on how to listen effectively. Poor listening undermines the ability to communicate with others.

Some time during this session is spent discussing the theory of listening skills, but it is essential that the majority of the time is spent by trying to put these theories into practice, throughout this and many other sessions of this module.

This practice should take the form of students, working in groups of three (talker, listener and observer), taking turns to listen to each other for 5 minutes on a topic of their own choice.

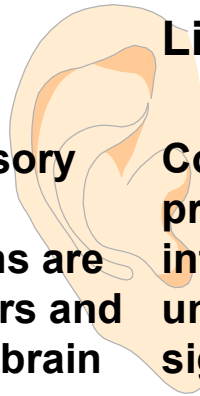
- The listener should be able to recount the important points made (without taking notes).
- The talker should comment on whether they had been attended to.
- The observer is able to provide comment on the interaction, and listening techniques used.



Hearing versus Listening

Hearing:

Physiological sensory process by which auditory sensations are received by the ears and transmitted to the brain



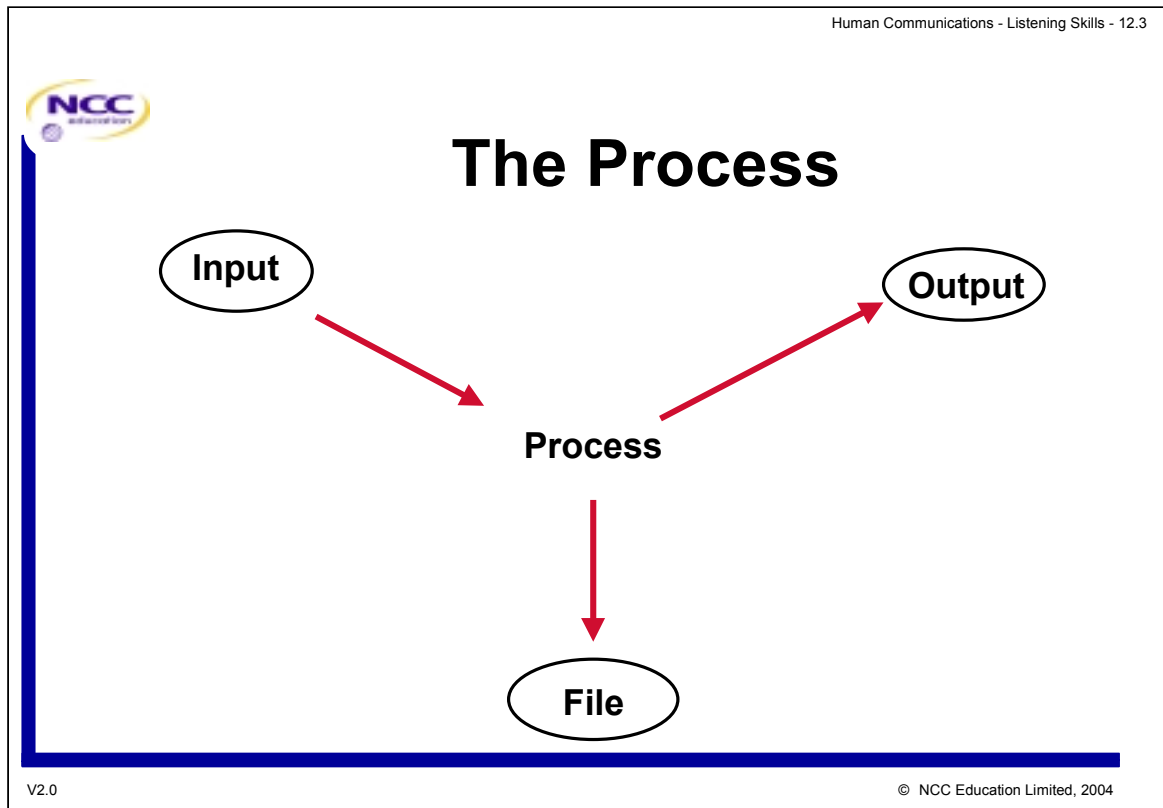
Listening:

Complex psychological procedure involving interpreting and understanding the significance of the sensory experience

Listening involves more than just hearing what is being said. Drakeford, in his book *The Awesome Power of the Listening Ear*, published by World Books in 1967, differentiates between hearing and listening as described above.

Listening involves the search for a full and accurate understanding of the meaning of another's message. It involves more than merely attending to verbal messages. To be a good listener, a person has to be able to *read* both verbal and non-verbal messages.

In this session we are going to look at listening to both verbal and non-verbal messages.



In all cases there is:

- an input – this may be words, body language or even sign language;
- an output – an acknowledgement that the message has been received and understood;
- a filing process, where parts of the message are stored away into memory for subsequent recall.

It may also be that the message is immediately written down and filed away in a filing cabinet, or even that a decision is taken by the recipient that this message is not needed, and therefore it is filed immediately into the metaphorical rubbish bin and forgotten.



Different Types of Listening

- **Comprehension listening**
- **Evaluative listening**
- **Empathic listening**
- **Appreciative listening**

There are four main types of listening:

- *Comprehension listening* is the kind of listening that people engage in when conducting fact-finding interviews or attending lectures. It involves listening to facts, ideas and themes that may be of future use.
- *Evaluative listening* is the kind of listening people engage in when trying to make judgements concerning the persuasive messages of others, such as sales persons and negotiators.
- *Empathic listening* is the kind of listening people engage in during counselling sessions, appraisal interviews and more generally when faced with someone who has a need to talk and be understood by another person. It involves the listener demonstrating a keenness to attend to and understand the thoughts, beliefs and feelings of the speaker.
- *Appreciative listening* is the kind of listening people engage in for pleasure. It might occur when listening to music, poetry or children playing. It involves the listener seeking out signals or messages that he/she wants to hear.



Influencing Factors

- **Selectivity**
- **Interpretation**
- **Personal bias - of both speaker and listener**
- **Message**
- **Environment**

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There are many competing demands for a listener's attention. An interviewer might be more interested in how the candidate is dressed – a mark on his tie, or the aura of tobacco smoke that surrounds him.

A colleague's loud voice might be a distraction, or the interviewer might only notice a hydraulic drill when it is switched off, or attention might be drawn if a person changes from a relaxed posture to bolt upright.

Background and culture might influence the meaning attributed to certain behaviours – being aware of one's own personal filters can help a person listen more effectively. An interviewer should prepare a checklist to help make sure that attention is paid to all the relevant messages and that the effects of selectivity are minimised.

The message itself can influence how much is received. If it is bad news, or the listener does not want to know, then the tendency is often to *switch off* the listening process.

Auditory noise is only one of many environmental problems; the listener's attention might be drawn by an interesting poster, or an attractive view from a window.



Active Listening - Objectives

- **Help the speaker**
- **Keep attention focussed**
- **Give appropriate weight to content**
- **Organise information in badly structured messages**
- **Minimise bias**

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Effective listening involves more than simply hearing what the speaker has said. It involves the search for a full and accurate understanding of the meaning of another's verbal and non-verbal messages. Active listening offers an approach to understanding other people's messages in a way that deals with many of the problems identified so far.

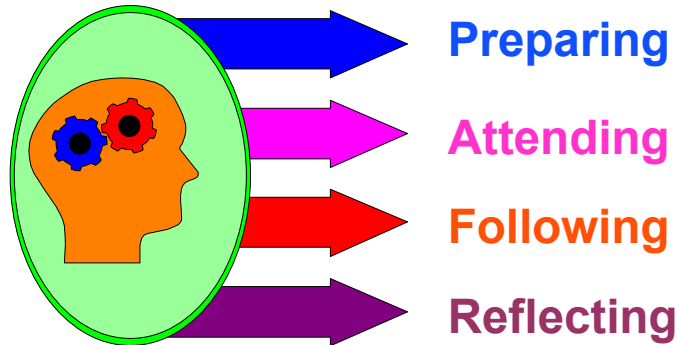
Attributes needed for active listening include:

- Help the speaker *tell his story* to the best of his ability.
- Keep the listener's attention focussed on the speaker's message.
- Help the listener give appropriate weight to what the speaker says.
- Be able to organise information being received so that sense can be made of even complex or badly structured messages.
- Minimise the problems of personal bias.

The skilled listener needs to be skilled at attending to both the factual and affective content of a message, and should neither ignore or be overwhelmed by the speaker's emotional state.



Active Listening - The Process



Listening skills can, therefore, be categorised under four headings, and practice should be undertaken in each of these areas.



Preparation

- **Ensure correct timing**
 - reduce risk of stress and fatigue
- **Put aside preoccupying concerns**
- **Remove risk of distractions**
- **Review background material**

The kind of preparation that the listener can engage in involves:

- arranging important listening tasks for a time when he/she is least likely to be stressed or fatigued;
- increasing his/her receptivity by making a conscious effort to put aside temporarily preoccupying concerns, such as a recent row with his/her boss or the need to book a holiday flight as quickly as possible;
- arranging an environment that contains as few distractions as possible, thereby encouraging all parties to concentrate on communicating;
- reviewing background material such as notes and reports or issues to be discussed – this kind of preparation can stimulate interest and help create the right mental attitude.



Attending

Remember the **SOLER** mnemonic

- Face speaker **S**quarely
- Adopt **O**pen posture
- **L**ean upper part of body towards speaker
- Maintain good **E**ye contact
- Try to be **R**elaxed

Everyone, at some time or other, has been told by a friend or colleague “you are not listening to me” – at which point they have leapt to their own defence by repeating verbatim what was said, but they had in fact not been listening and this had been apparent to the speaker.

The listener, all of the time, should be giving out cues and messages with their body. It is possible for the listener to deliberately project an image that tells the speaker that they are ‘with him’.

Use of the SOLER mnemonic may help the development of these *attending* skills.



Following

- **Door openers**
- **Minimal prompts**
- **Accents**
- **Infrequent questions**

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The listener can:

- encourage the speaker to talk;
- better concentrate on the task of listening;
- gently seek out more information to help promote a better understanding of the speaker's message;

by using door openers, minimal prompting, accents, statements, questions, attentive silences and a number of special concentration techniques.

A *door opener* might be a description of body language:

- “you are not looking yourself today” or “you sound a bit low”

A minimal prompt might be:

- “mmm” , “really?” or “tell me more”

An accent is a restatement of one or two words and might be:

- Manager: “The report seems OK”
- Colleague: “*Seemed OK?*”
- Manager “Well, what I expected was”

Infrequent questions, generally we ask too many questions. It is often only necessary to ask questions when we believe that the speaker has more to say, but does not know how to say it.

- “Could you say a little more about why negotiations broke down?”



The Use of Silence



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People sometimes ask too many questions because they cannot cope with even a short silence. They need to fill the gap.

Learning the art of silent responsiveness has been described as the key to good listening. Silence can give the speaker time to consider what to say. Watching the body language of the speaker can often be a good indicator as to whether the speaker is thinking, or whether the speaker believes it is the listeners turn to speak.



Reflecting

- Paraphrasing
- Feelings
- Hidden meanings

**“When we think we
know is when we
don’t know”**

Chinese proverb

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Students should continue to practise reflective listening both in their professional and private lives as this will be of significant benefit to the development of their listening skills.


Reflective listening is the skill of mirroring back to a person, in your own words and manner, what someone is saying to you. This can be either through paraphrasing a message, reflecting feelings if there is a high emotional content to the message, or trying to pick out hidden meanings if a speaker is having difficulty with an issue. It allows speakers to hear what they are saying, see what they are meaning and feel what is happening and, through this process, come to a better understanding of themselves and their situation.

Paraphrasing what the other has said also goes a long way towards preventing misunderstandings – we often think or feel that we understand what a person has said but this is just guesswork, unless we check our understanding out with the speaker.


In summary:

- Reflect the content of the message.
- Be short and to the point.
- Reflect only the essentials of the message.
- Use your own words.

Human Communications - Listening Skills - 12.13



Non Verbal Communication



**“We do a lot of looking:
we look through lenses,
telescopes, television
tubes
Our looking is perfected
every day,
but we see less and
less”**

Frederik Frank

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Look at the stick figures shown here. Using nothing more than the posture and implied movement they manage to convey sadness or despair, happiness, anger and amusement. If we can do so much with these, how much more can the human body convey.

Other aspects of non-verbal communication, and listening through looking and watching can be used to improve our overall listening skills:

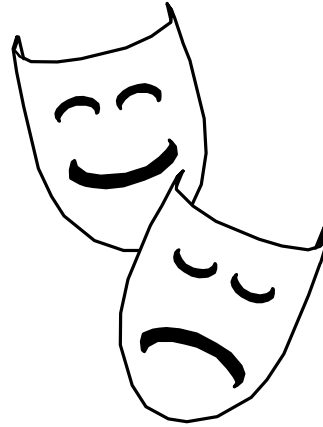
- Expression.
- Eye behaviour.
- Gesture.
- Posture.
- Voice.
- Appearance.
- Touch.
- Time.
- Space.

It may be worth referring back to the discussion held earlier during this session on the problems of telephone communications.



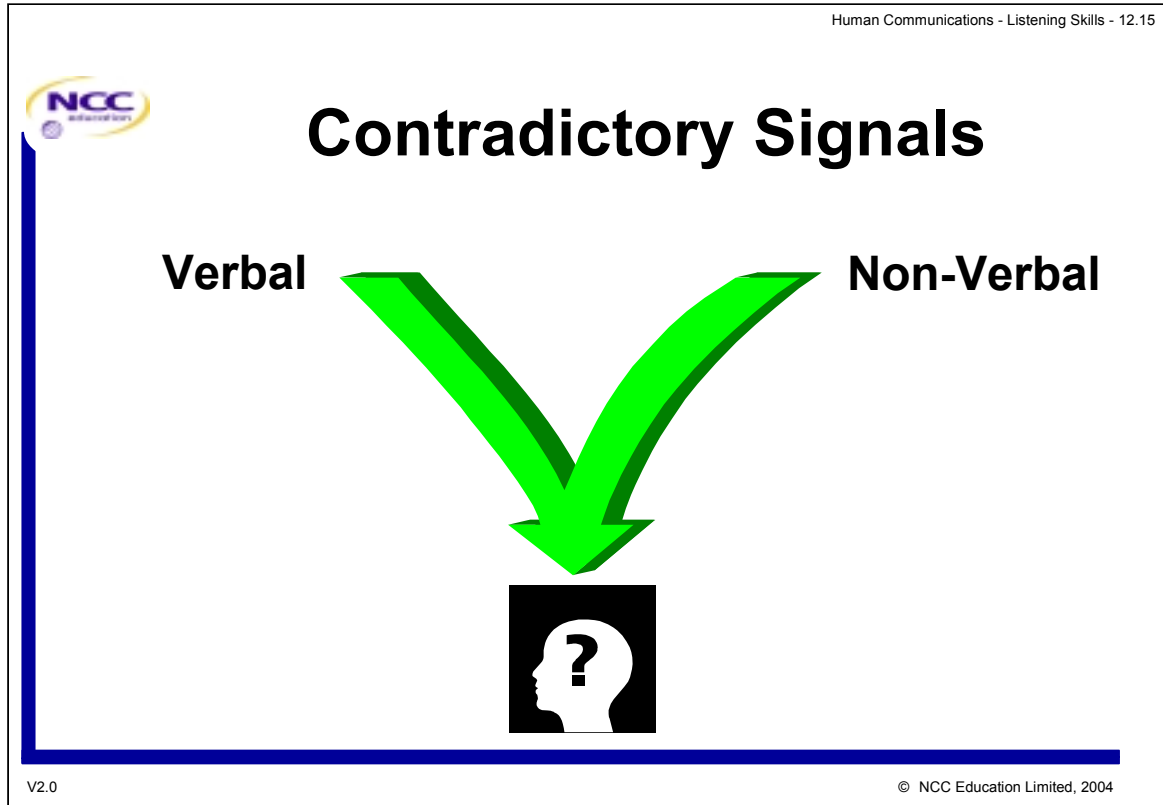
Facial Expressions

- Surprise
- Fear
- Anger
- Disgust
- Happiness
- Sadness



Most people pay a lot of attention to other people's faces, because they are a rich source of both emotional expressions and interaction signals.

The lecturer may like to hold a discussion on what attributes of the face indicate each of these emotional states.



What is the true meaning of the message if a red-faced man bangs the table with a clenched fist and declares that he is not angry?

Research evidence suggests that non-verbal behaviours generally offer the most reliable clues to what a person is really feeling, in spite of his denial that he is angry.

It appears that people are less likely to inhibit or manipulate certain signals. These tend to be those which they are least aware of, believe others pay little attention to, or are beyond their control. In decreasing order of believability the following seven elements are proposed.

- *Autonomic signals*: such as perspiration, skin colour and respiratory patterns.
- *Leg and foot signals*: such as tightening of leg muscles and jerky, aggressive foot actions.
- *Trunk signals*: such as muscular tonus of the whole body affecting posture.
- *Unidentified gesticulations*: such as assertive finger wagging, imploring palm-up hand gestures or hand chops.
- *Identified hand gestures*: such as thumbs up.
- *Facial expressions*: such as anger or surprise can be easily faked, but look out for the frozen smile hidden underneath!
- *Verbalisations*: people are able to exercise most control over the verbal messages – and therefore they are the least reliable guide to true feelings, when contradictory signals are observed.



Improve Your Listening

- **Construct a profile through self assessment**
- **Compare with 'good' and 'poor' listener profiles**
- **Consider how you might improve**
- **Practise three times daily - *forever***

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Before you attempt to change the way you listen, construct a profile of the listening skills you use. Behave as you normally behave when listening and, as soon as possible after the listening episode, review and record the skills you think you used. Consider how your profile compares with those you have constructed for good and poor listeners.

- Which are you most like?
- Note the skills you either do not use, or use least frequently. Consider how you might use them and find opportunities to practise them.
- Commit yourself to find at least three occasions each day to put these skills into practice.
- Gradually widen your repertoire until you are regularly using a wide range of preparation, attending, following and reflecting skills every time you listen.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 13 Human Communications - Interviewing Skills

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This session is primarily concerned with the skills required for obtaining information.

This is another core skill required by an Information Systems professional, and it builds on the listening skills discussed earlier in the module.

Interviewing can take place for several reasons:

- Selection interviewing a candidate for employment, or reviewing performance of a team member.
- Interviewing a prospective system user to elicit their requirements.
- As part of a customer satisfaction survey, to determine the quality of a delivered product.
- Undertaking market research prior to development of new product.
- Assessing an organisation's maturity in their use of good practice in IT management and development techniques, and hence their capability to produce certain kinds of product.

The subject matter and objectives of each of these interviews will differ significantly, but the basic skills involved in structuring the interviews and gathering the required information have many common elements.



Definitions - 1

Interview:

A conversation with a purpose

Bingham Moore and Bruce 1942

This is a wide ranging, umbrella-like definition which encompasses many kinds of purposeful conversations ranging from disciplinary interviews to counselling sessions, and possibly even negotiations.



Definitions - 2

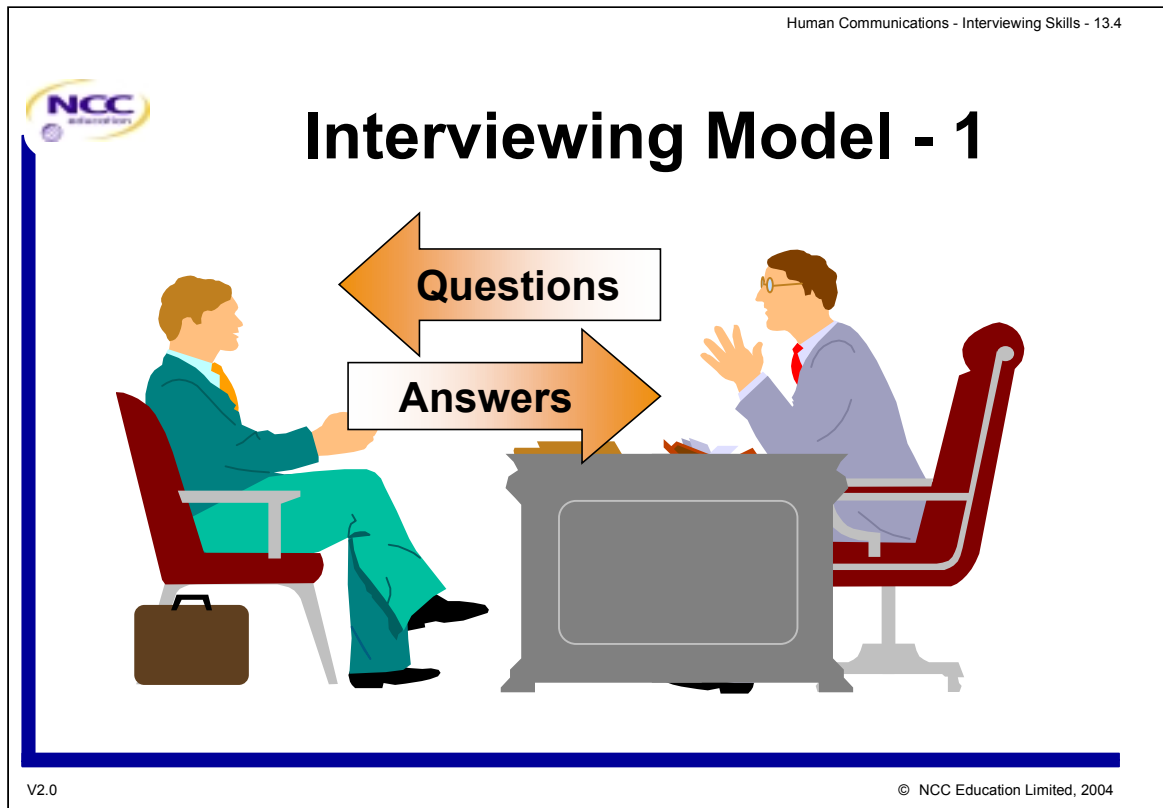
Interview:

A face-to-face interaction in which one (or more) person(s) seeks information from another

Hayes

For the purpose of this session, a much narrower definition has been adopted as shown above.

The effective interviewer is someone who is able to structure and manage the encounter in such a way that information irrelevant to the purpose of the interaction is largely eliminated and relevant information is fully and accurately communicated in a relatively brief period of time.

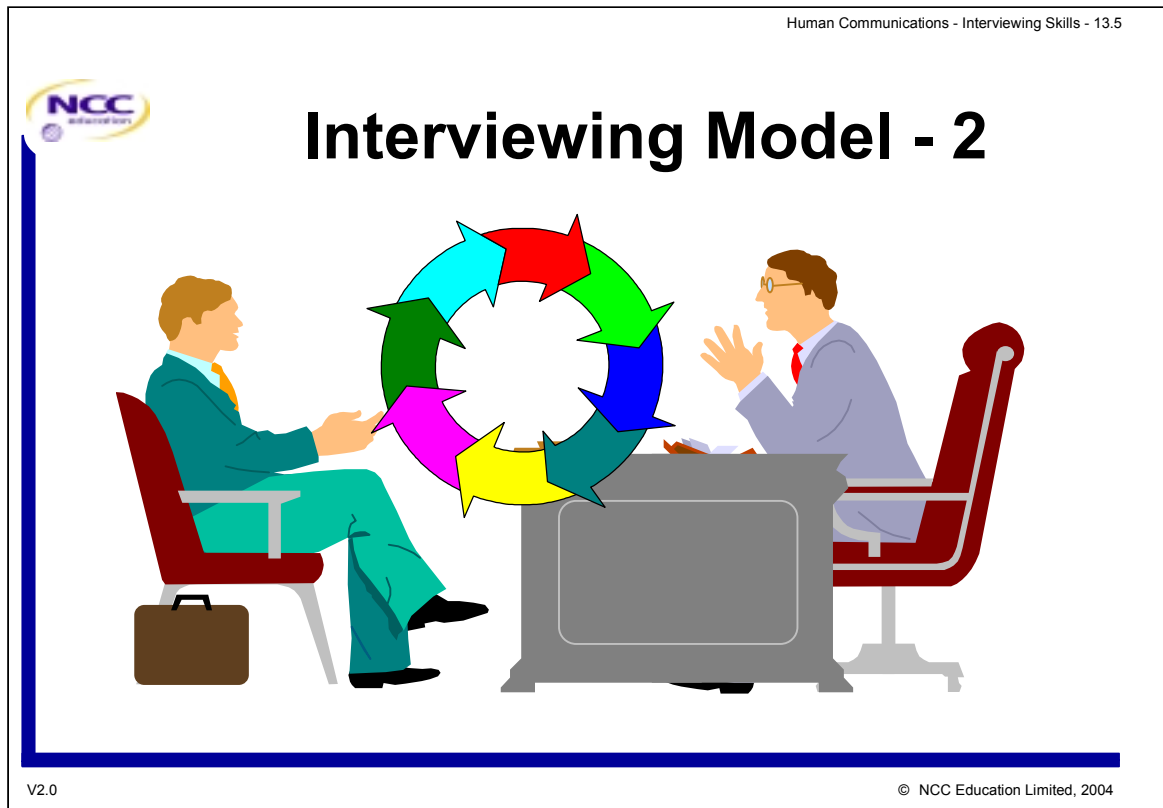


An often used, but over-simplified model of the interview presents the process solely in terms of the interviewer getting information from the respondent and fails to take full account of the interactive nature of the encounter.

Obtaining full and frank answers from another person is not an easy task. The interview is a complex social encounter in which the behaviour of each party is influenced by the other.

Respondents are aware that interviewers are observing what they say and do and, on the basis of the observations, are making inferences about them. Consequently, respondents may not openly and honestly answer all the questions that they are asked.

The problem can be further complicated in the interview situation; the respondent's ability to manage his/her behaviour, "to put on a performance", might be impaired. If respondents are too sensitive to the fact that they are being evaluated, they may become apprehensive and hence perform poorly.



In reality, each exchange between interviewer and interviewee has a cycle of actions.

Hayes suggests the following takes place:

1. Interviewer places question.
2. Interviewee interprets question.
3. Interviewee considers and rehearses action.
4. Interviewee responds.
5. Interviewer interprets response.
6. Interviewer considers and rehearses next action/question.

Each cycle builds on previous cycles as each party becomes more involved in the interaction, and each is more likely to be able to predict how the other is likely to react given certain questions or responses.

As the interview progresses therefore and both parties become more relaxed, the level of concentration required increases, to enable effective use of all the information (both verbal and non-verbal) that has been received.



Bias in Interviews

- **Possible inconsistencies between**
 - **interview data and data from other sources**
 - **interviewees interviewed twice by same interviewer**
 - **interviewees interviewed by different interviewers**

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Interviews can fail for many reasons, and evidence exists that shows many inconsistencies between data obtained by interview that in a perfect world would not have existed.

Many are the parallel with the barriers and filters talked about in the earlier session entitled *Introduction to Human Communications*, but in this context are often categorised into three categories:

- Background characteristics – such as age, gender, race and status.
- Psychological factors: – such as attitudes, motives and expectations.
- Behaviour of the interviewer – such as using appropriate combination of questions and levels of probing, and summarising. These are discussed in the next few visuals.



Purpose and Preparation

- **Clear purpose**
- **What information is needed**
- **How information should be elicited**
- **Behaviour required**

Understanding the purpose of the interview is paramount. Without a clear purpose, it is likely to be just a time-wasting activity.

Given that a clear purpose exists, time should be set-aside prior to each interview to prepare for the interaction. The output of this preparation time is a strategy of how the required information is to be obtained and a plan of how the interview is to be conducted.



Induction

- **Provide briefing documents**
- **Scene setting**
- **Establish rapport and motivation**

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The initial part of the interview is the most crucial. The interviewer needs to communicate its purpose and establish terms of reference.

It may have been appropriate to issue documents briefing the interviewee on the objectives of the interview and the topics to be discussed prior to the interview itself taking place. This should speed up the induction process, but the interviewer still needs to be satisfied that any such documents have been read and understood by the interviewee.

The interviewer needs to ensure that rapport and motivation of all parties involved is established via techniques such as:

- Ensuring appropriate seating arrangements are set up.
- Ensuring telephone interruptions are avoided.
- Standing up and shaking hands – or other appropriate greeting made.
- Use of *attending* techniques as discussed in the session on Listening Skills.



Content and Coverage

- **Relevant**
- **Independent**
- **Assessable**
- **Sufficient points to cover topic**

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When designing the interview plan during the preparation, the interviewer needs to give thought to the kind of information required.

All points in the plan should be relevant to the purpose and as independent from each other as possible in order to avoid duplication of questions and potential time-wasting. They should provide sufficient information to enable assessment of the quality of responses given, and cover all the dimensions needed.

The development of a detailed plan does not represent an ordering of questions to be asked in an interview, but it provides a framework or a checklist against which information can be allocated as and when it is obtained.



Organisation of Topics

Use of a **frame** of reference

- **literally** - if a subject is complex
- **laterally** - to avoid leading interviewee

When deciding the order in which topics are to be addressed in an interview, a useful guiding principle is to put yourself in the shoes of the respondent and select an ordering that is most likely to help him/her understand the questions and motivate him/her to respond.

A respondent may easily misunderstand complex questions if he has not been given cues that will key him into a *frame of reference*. Topics can be ordered in such a way that the respondent is encouraged to think about a range of issues before answering a question on a more complex topic.

Thus on the one hand the organisation of topics in an interview schedule can provide the respondent with a frame of reference that will help him to better understand a difficult or complex question, the organisation of topics can also lead the respondent to answer in a particular way. This can be dangerous when the aim of the interview is to explore how the respondent really feels about an issue.

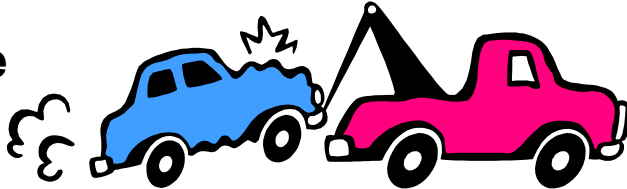
The lecturer should set the students an exercise to develop an interview plan and a frame of reference to undertake an interview on a subject that is currently receiving significant local media attention.



Questions - Types

Closed

- Did you see the collision?



Open

- What made you stop and look around?

Leading

- Did you see the red car drive through the lights and collide with the blue one?

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The formulation of questions posed by the interviewer can have an enormous impact on the quantity and quality of information the respondent will disclose. There are two main aspects to question formulation:

- The degree of freedom given to the respondent to answer (open *versus* closed questions).
- The choice of words – the extent to which the question signals an expected or preferred response (*leading* questions).

The most common use of closed questions are those that require the YES or NO responses, or quantitative responses to ‘how many/much/old’ questions – these are useful where simple factual information is required.

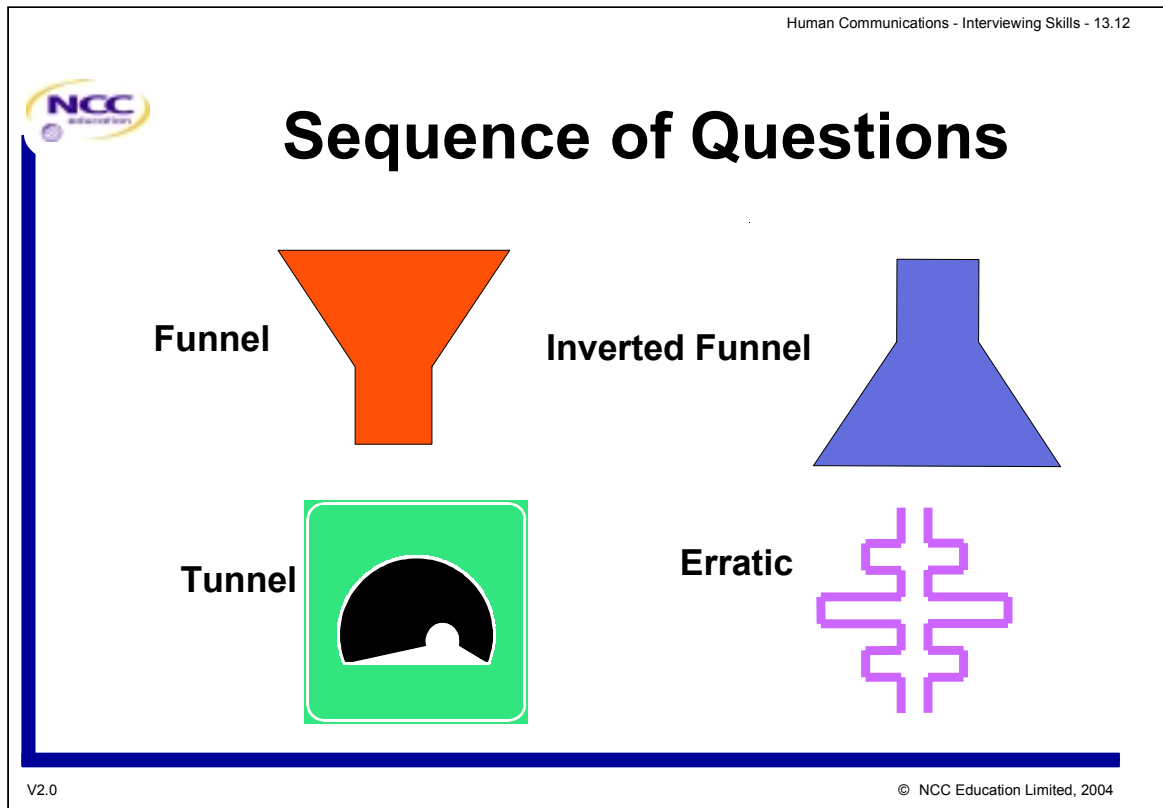
Open questions leave the respondent to answer a question freely in their own words, and encourage them to talk.

Compare the closed question:

“Do you like your new job?”

with the open equivalent

“What do you think of your new job?”



Likewise selecting an order for the different types of question is crucial. Each selection of sequence has a place in an appropriate setting.

- The *funnel* is a sequence which begins with a very open question, and then continues with a gradual decreasing level of openness, and each successive question becomes more focussed.
- The *inverted funnel* can be used to help the interviewer gather relevant information; for example, about what happened or why the respondent behaved in a particular way, before seeking to explore the reasons why.
- In some circumstances, all the questions may exhibit the same degree of openness, for example to elicit objective or factual responses as quickly as possible. This is known as the *tunnel* sequence.
- *Erratic* or inconsistent sequences of questions can be dangerous if used without care, as they are often designed to disorientate the respondent and to obtain information that the respondent would prefer not to reveal. Not knowing what kind of question to expect next can confuse the respondent.



Probing

- **What exactly do you mean?**
- **Why did you say that?**
- **What happened next?**
- **Do you agree with that?**



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No matter how much care the interviewer has exercised in wording and asking a question, there will be many occasions when the initial response will be incomplete or inadequate in some way. Probing is the technique that can be employed to encourage the respondent to provide further information.

There are three criteria for effective probes:

- They must enable the interviewer to motivate the respondent to engage in additional communication on the required topic.
- They must enhance, or at least maintain, the interpersonal relationship between the interviewer and respondent.
- They must accomplish this purpose without introducing bias or modifying the meaning of the primary question.

Bias and modification of meaning are aspects of probing that must be managed carefully. Simplifying, shortening or rewording questions can result in the intended meaning of the primary question being changed significantly. Bias can also be introduced if the interviewer fails to provide the respondent with sufficient time to answer the primary question before asking a supplementary or probing question.



Closing

- **“Before we finish let me review”**
- **“Thank you for your time, that has been very helpful”**
- **“Can we meet again before I complete my research?”**



Before closing the interview, it is necessary to ensure that the main purpose of the interview has been fulfilled. The absence of appropriate closure behaviour can leave the respondent unsure about whether he should wait patiently for another question, continue talking, or get up and leave.

One of the most useful closure behaviours is the summary. It helps the interviewer check that she has remembered and recorded the main points discussed. It reassures the respondent that the interviewer has listened attentively and provides him//her with the opportunity to clarify or elaborate.

Remarks such as those shown on the visual, help to persuade the respondent that his/her participation in the interview has been worthwhile, and can be especially important when the interviewer wants to arrange a follow-up interview.



Improving Interviewing Skills

- **Self assessment**
- **Try out different strategies in 'mock' setting**
- **Solicit feedback from interviewees**



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The first step in developing interviewing skills is to:

- assess how effective you are at getting information in an interview setting;
- see which techniques you are using effectively, and which could be used or improved upon.

The best way to improve is to practise, preferably in a non-critical setting, where constructive feedback on performance is possible.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 14 Resource Management - Managing Subcontractors

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Organisations need information systems and software products to help them manage their activities and to supply products and services to their customers. Often these systems and software products are key to their success, particularly for a small organisation. Acquiring such an information system is a significant task for the purchasing organisation if the expected benefits are to be realised. The ability of the customer to select the right system or software, establish an effective relationship with the right supplier and manage the contract will maximise the likelihood of obtaining the right solution within the desired timescale and cost.

Equally, suppliers must be able to deal effectively and appropriately with their customers in order to deliver their products and services predictably and profitably and in the first place give them confidence that this can be achieved.

Although the scale of the problem may differ, the same issues arise when a provider of Information System (IS) products and services is unable to resource the requirements, and it is necessary to utilise a subcontractor.

This session covers the topic of subcontracting an IS development or service, regardless of what your position is in the supply chain.

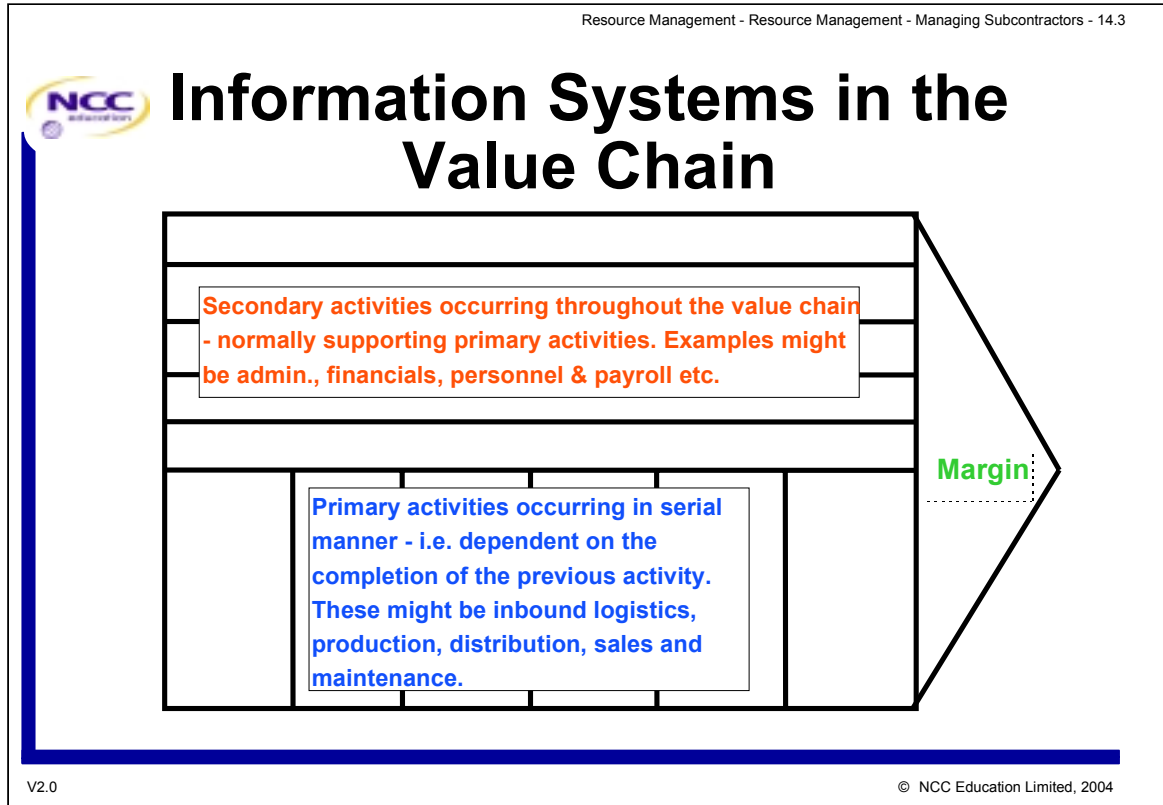


Topics

- **Value and supply chains**
- **Procurement strategy**
- **Selection of supplier**
- **Achieving a working relationship**

From a customer's point of view, we are going to discuss the procurement or acquisition strategy – how to select an appropriate supplier to meet your requirements and, once selected, how do you achieve a working relationship with your supplier.

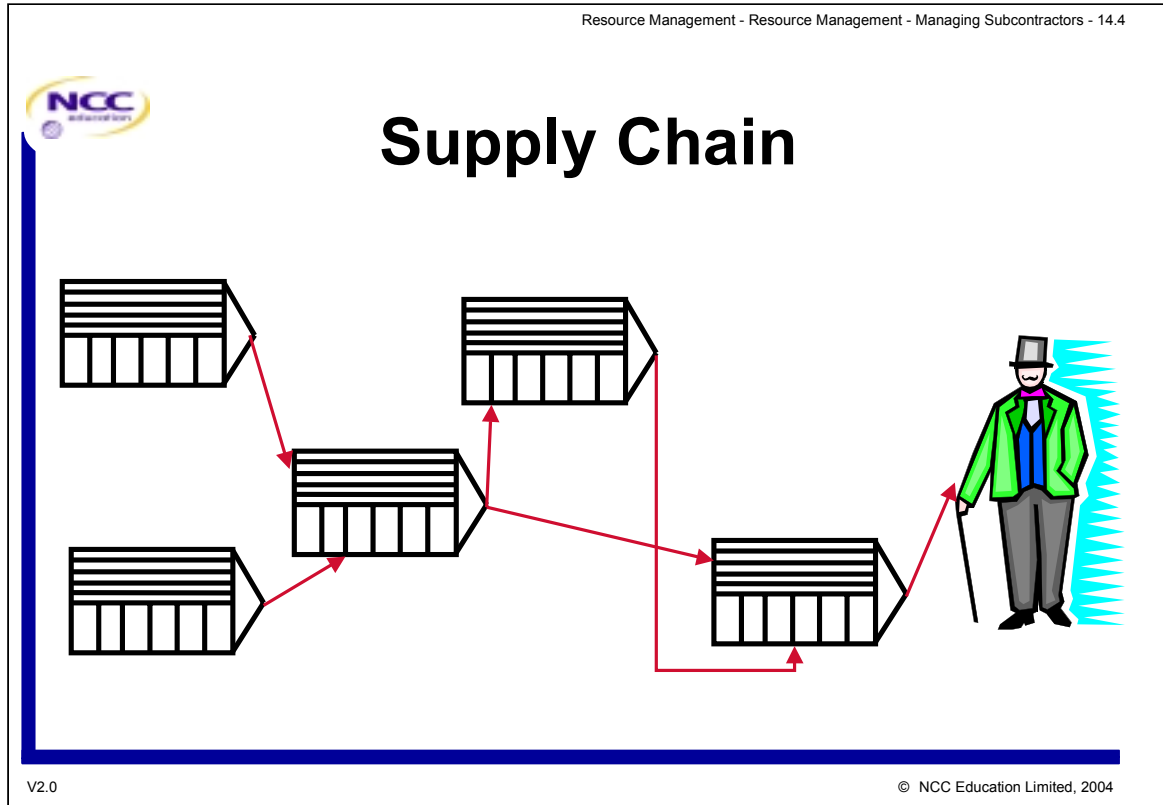
But before we look at the detail of subcontracting, we explore the value of IS to a business, and look at an example supply chain.



Information Systems can add value to both primary and secondary activities of any business – not just those involved in the Information Systems sector.

Any one or all of these activities may be supported by IS, and may be under the direction of local management. If local departmental management are solely responsible for sourcing their own IS systems or services, then an organisation can soon find itself dealing with many different suppliers – or even one supplier, but through many different communication channels. This can cause an organisation to waste both time and cost through investment in non-compatible systems.

It is paramount therefore, that a corporate strategic approach to the investment and acquisition of IS systems and services is established.



Supply chains occur when two or more organisations or individuals are involved in the production or delivery of a product or service. There may be many such organisations for each product – each adding their own value to the product and margin onto the cost that must finally be placed on the end-user(s).

In general, the longer the supply chain – the greater the risks involved.

- The earlier your organisation is placed, the further away you are likely to be from the end-user.
- The closer you are to the end-user, the more dependent you are on all the organisations before to supply on time and to the required quality levels etc.

If an organisation has no IS acquisition strategy in place, it is a useful approach to analyse the current supply chain(s) in which the organisation resides.

At least, understanding the chain of supply related to the particular system or service that you are intending to subcontract can assist in the management of the risks that may affect a successful completion.



The Process

- **Identify the need**
- **Prepare and negotiate contract**
- **Monitor the acquisition**
- **Evaluate the result**



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The process of acquisition involves several distinct steps:

- *Identify the need.* Identify a need to acquire, develop, or enhance a system, software product, or software service. Once this need is identified, the system, product or service can be selected.
- *Prepare and negotiate the contract.* Negotiate a contract with the supplier that clearly expresses the expectation, responsibilities, and liabilities of both the customer and the supplier.
- *Monitor the acquisition.* Monitor the acquisition against the agreed acquisition documentation so that progress can be reviewed and evaluated to ensure that specified constraints such as cost, schedule, and quality are met.

The successful implementation of the process will result in the following outcomes:

- A contract will be developed which clearly expresses the expectations, responsibilities, and liabilities of all parties involved.
- A product or service will be produced which satisfies your customer's/user's stated need.
- The acquisition will be monitored so that specified constraints (such as cost, schedule and quality) are met.



Critical Success Factors

- Improved efficiency
- Lower costs
- Improved service levels
- Support for future business
- Complying with industry standards
- Happy users



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The costs of acquiring or enhancing a software system are often underestimated as expectations and ambitions tend to increase during the production process. Controlling these ambitions requires:

- careful management decisions – both by the *customer* and *supplier* to ensure no detrimental effect on the success of the project;
- a clear understanding by the customer of the needs to be met by the system, and its significance and value to the business is essential.

Clear identification of project success factors and appropriate management planning and control of the project by both parties are therefore crucial to this whole process. Examples of critical success factors and management responsibilities for customers are listed below.

Customer success factors are mainly related to the impact that the new product or service will have on the ability of the organisation to carry on its business more effectively. These include:

- Improved efficiency of the organisation.
- Decrease in costs.
- Improvement of service levels.
- Support for future business policies and directions.
- Achieving or retaining compliance with industry standards.
- The degree to which the users welcome the system.



Customer Responsibilities



- **Budget and plan**
- **Develop and control requirements**
- **Review interim deliverables**
- **Attend progress meetings**
- **Acceptance testing**
- **User training, etc.**

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Customers can never relax; the customer needs to retain an involvement throughout the acquisition process. In terms of good management control, the customer responsibilities are to:

- decide on and secure the project budget;
- define its project and quality plans;
- control the requirements, particularly if they change;
- define the customer's and supplier's expected involvement in the project;
- sign off documents appropriately, and not waste time unnecessarily;
- attend review and progress meetings;
- supply requested information and decisions in a timely fashion – so as not to hold up the supplier;
- conduct or witness acceptance tests;
- organise user training;
- provide an interface between the users and the supplier or support organisation for post-implementation support;
- comply with procedures for reporting defects to the supplier and differentiate between the faults and enhancements;
- manage the integration with other systems as appropriate.



Things to Think About

- Needs understood?
- Roles defined?
- Form of contract?
- Special factors?
- Package versus bespoke?
- Legal issues and risks identified?



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Before the contract to undertake a task is set and signed, it is important to ensure that all of the following are taken account of:

- Are the needs of the users clearly understood?
- Is there a real requirement – or is it a just a set of *wish-lists*?
- Are the roles of the customer and supplier (potential or actual) defined and understood?
- What form of contract is appropriate: fixed price; cost plus incentives; time hire; or time and materials?
- Who will produce the detailed specification and how?
- Have the project success criteria been established?
- How are the non-functional system requirements to be established and expressed?
- Will special factors such as safety-criticality affect the development and test process and therefore costs and timescales?
- Will a *customised* package or a bespoke system be the most appropriate solution?
- Have legal, regulatory and ethical issues of the project been considered?
- Have the risks to the project been identified?



Identifying the Need

- **Background to the requirement**
- **Outline requirement**
- **External environment**
- **Assumptions and expected changes**
- **References**
- **Acceptance or success criteria**



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Careful consideration of business objectives and user needs is vital and must represent a realistic assessment of what can be achieved. They must be endorsed by senior management and agreed with the appropriate level of users and all interested parties. These needs are often documented and analysed as part of a *feasibility study*, which collates the primary needs of the users or the business, and examines different approaches to a solution.

Once some level of feasibility has been determined, a set of high level requirements can be established and documented. These often include information on:

- background to the requirement;
- outline requirement;
- external environment;
- assumptions and expected changes;
- references;
- acceptance or success criteria.

Identifying the need is required, regardless of the source of the labour.



Information System Procurement Options

Product	Often shrink-wrapped
Customised product	Customised by customer or user
Tailored product	Often tailored by supplier or developer
Bespoke development	Could be part of 'black-box' purchase (often invisible)

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Just concentrating on the product side of acquisition – there are four main options when deciding to procure:

- *Shrink-wrapped Commercial Off The Shelf (COTS) product* – which it may be possible to configure to your requirements, but such configurations are limited to the flexibility of the product – amendments and the fixing of problems can be tortuous even if they are possible. Examples include word processors, spreadsheets, personal organisers, etc
- *Customised product* – where additional flexibility of use has been designed into the product to enable it to be customised by many users to meet their specific requirements. The level of support from the supplier in these cases is likely to be higher than for COTS. Examples include financial accounts packages.
- *Tailored product* – where the basis of a product already exists – possibly having been developed for another customer, and it needs to be specifically tailored to your requirements by the supplier/developer. Examples may include Point of Sale systems, warehousing and distribution systems.
- *Bespoke development* – where the entire product needs to be developed specifically to meet your requirements.



Strategy for Acquisition



- **Train participants**
- **Consider risk transfer**
- **Assess different contracting scenarios**

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Once the customer has determined the need and the high level requirements, an acquisition strategy can then be considered. This is a form of risk management, and the approach is dependent on the specific situation and problems posed by the type of project proposed. The approach may include:

- providing training to all the participants in this stage of the project, so that they are aware of the implications of their decisions and actions on the success of the project;
- using legal or financial mechanisms by including appropriate clauses in the contract or taking out insurance policies;
- assessing the appropriateness of different contracting scenarios such as:
 - a single contract with a single supplier;
 - a series of contracts with one or more suppliers – e.g., dividing the overall work into contracts for the *specification*; *development* and *maintenance* of the system;
 - undertaking the project as a joint venture with one or more suppliers;
 - arranging for phased delivery of system components.



Eliciting the Requirements



- **Customer responsibility**
- **May use consultants**
- **Control throughout**

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The Requirements Elicitation activity *begins* soon after the need for a system or service is identified, *peaks* during the early development phases of Requirements Specification, and *continues* throughout the development and use of the system or service, to ensure that the system or service continues to meet the changing needs of the business and its users. The responsibilities for undertaking this activity change throughout the life cycle, depending upon the type of system under consideration and the type of customer/supplier relationship established.

This process is mainly the responsibility of the customer, but the customer may not have the staff capable of performing the required tasks.

It is possible that an independent consultant be contracted during the early *needs analysis* phase and this consultant retains responsibility for managing the requirements throughout the life of the project and system. It is more likely, however, that the customer will begin the process, and then hand over to the supplier on award of contract, though it should be noted that the customer is ultimately responsible for deciding which requirements are implemented according to business priorities and constraints.

Whoever is performing this role however, it is essential that control be kept of all proposed requirements – whether they are included in the first release of the Requirements Specification, or they occur during development or maintenance.



Requirements for Shrink-Wrapped Product

- Who identifies user needs?
- What questions?
- How to analyse answers?



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If there is no end user identified, at this stage, i.e., the product is intended for a mass market – it is important to establish alternative sources of user input, such as via the Marketing Department of your organisation. It is important to:

- identify who are the people that need to be interviewed, and which documents form the basis of the customer's needs;
- ask the right questions;
- analyse the answers.

It may be necessary to undertake some market research to evaluate the proposed properties of the product.



Selecting the Supplier - Where Do You Start

- **Study market**
- **Make short list**
- **Obtain help if needed**



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Selecting the most cost-effective and capable supplier will contribute significantly to a successful project. The customer needs to ensure that suppliers know and understand what is required and can respond in a way that can be effectively evaluated. *(Note: The cheapest supplier is not necessarily the most cost-effective or capable.)*

For many organisations, experience gained over a number of years will enable them to make an initial selection of a number of potential suppliers who are likely to satisfy their needs on a particular type of project or for particular applications. If you do not have this level of experience it may be possible to obtain advice and information from:

- informal consultation with other similar companies or relevant trade associations;
- studying advertisements in journals related to the organisation's business (this can provide a good indication of companies that believe they can meet the service needs of the business area);
- using a consultant with experience in your business domain and the type of supplier that you expect to use.



Selecting the Supplier - Short-Listing

- Use pre-defined criteria
- Financial position
- Past projects/ assignments
- Staff skills
- Commitment to quality and process improvement



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A short list of suppliers to whom to send the Request for Proposal can be drawn up by examining the following characteristics:

- Financial position of the company and number of years in business – also by studying the last annual report.
- Obtaining details of past and current projects, directly related to the required system; this may be extended to include a requirement to demonstrate experience in any novel or risky areas of the requirement, and taking up references from previous successful applications in similar industries.
- The number and turnover of staff along with their skills, qualifications and experience.
- The supplier's commitment to process improvement and membership of any software quality or process improvement bodies or associations.
 - *How do you assess an organisation's commitment to quality and process improvement?*



Selecting the Supplier - Evaluating Responses

- **Separate**
 - **product requirements**
 - **management requirements**
 - **conditions of contract**
- **Use weighted ranking**



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The Request for Proposal or the Invitation to Tender should be structured with Proposal Evaluation in mind. A considerable amount of time and effort needs to be devoted to devising a list of questions to ask potential suppliers. If the information is elicited in a consistent and usable form, meaningful evaluation is possible in a realistic timescale. It is also important to ensure that sufficient time is allowed to the suppliers for preparation of proposals.

Evaluation of the responses is easier if the following separation is distinct between:

- the system requirements;
- the requirements for the management and control of the project;
- the conditions of contract such as delivery schedules and IPR (Intellectual Property Rights), and warranty requirements.

Ensure that you treat all potential suppliers equally. For example, if the deadline for responses is extended, *all* should be informed.

It may help to use weighted ranking to score the responses from the suppliers, in order to create a preferred ordering of supplier. This is performed by allocating a priority to each of the requirements, and scoring each supplier's response against their compliance with each requirement. Simple arithmetic will then enable an ordering of preferences between the suppliers.



Progress Monitoring - Achieving a Working Relationship

- **Maintain communication**
- **Be flexible where possible**
- **Focus on results**
- **Apply risk management**



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The customer needs confidence that the supplier is able to deliver the required product and/or service and, therefore, fulfil the contract. Where problems or risks are identified, the customer needs to be able to work with the supplier to decide on corrective actions or improvements. The key requirement is that the expected products are delivered successfully in accordance with the contract system or service requirements.

It is essential that the customer retains close visibility of the supplier's processes. The customer project manager needs to be able to identify activities which are likely to put the project at risk – either of not meeting timescales, exceeding budget or not achieving required quality. Mechanisms for obtaining and retaining the required level of visibility need to be established prior to the signing of the contract. These are likely to be by the use of regular Progress Reports, attending Joint Reviews, or by undertaking project evaluations or audits.

Where the development is further sub-contracted by the supplier, the customer organisation may require the supplier and sub-contractor to sign an agreement giving the customer direct access to information on the sub-contractor's performance during each life cycle phase.



Progress Monitoring - Nearly There!

- Review deliverables
- Provide prompt feedback
- Attend progress and technical meetings
- Agree acceptance and installation processes
- Use Service Level Agreement targets

Both customer and supplier need to agree whether the contract has been satisfied and to determine how effective the deliverables will be.

The system or software acceptance phase of a software development project is normally the last phase of the life cycle before operation, marking the end of the development of the software and the beginning of the actual use of the system as envisioned at project initiation. This is the time during which the customer and users need to find out whether or not the system is, in fact, the one they expect.

However, the product acceptance activities are not restricted to the product acceptance phase. They begin early in the development life cycle and continue throughout the operational life of the system. These include monitoring the supplier's use of appropriate techniques and testing strategies during the development and maintenance of the system. Also, where the requirement constitutes the delivery of a service, continual assessment throughout is typically by means of targets within a Service Level Agreement. One of the characteristics of a service is that acceptable performance achieved to date does not guarantee the same in future and, therefore, *continual* evaluation of performance is needed.



Planning to Accept - 1

- Objectives of the tests to be carried out
- Cross reference to appropriate requirements
- Resources required
- Testing standards
- How test inputs are to be generated?
- Input required and the expected output
- Pre-conditions
- What if the test cannot be run as specified?
- Tracking procedures

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Acceptance needs to be well planned in advance, along with an agreement as to what constitutes *acceptance*.

An Acceptance Test Plan or Specification, which becomes the driving force behind this process, needs to include items such as the following:

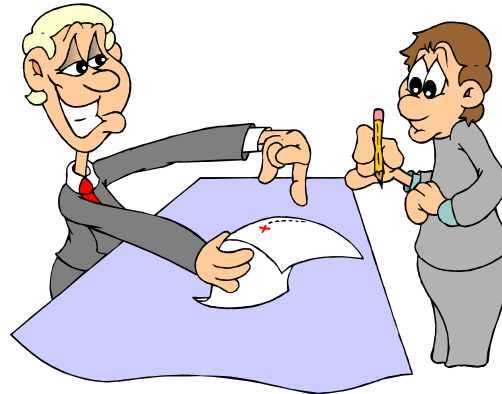
- Objectives of the tests to be carried out.
- Cross reference to appropriate requirements.
- Resources required, including personnel, testing tools, interfaces to other systems etc.
- Details of any testing standards to be used.
- How test inputs are to be generated. For example, written by hand, converted from live or historical data, random test data generators, etc.
- For each individual scripted test, an exact description of the input required, the expected output, the order in which the test items are to be input and where and how the test scripts will be stored and updated.
- Pre-conditions or entry conditions for running each test.
- Procedures to be followed if the test cannot be run as specified.
- Tracking procedures to monitor all executions of the test.

It should be remembered, however, that the acceptance testing process should be in the form of a demonstration – not a destructive test – you should not be trying to break the system at this point!



Planning to Accept - 2

- **Allow unscripted testing before handover**
- **Ensure user testers are given appropriate training**



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Some unscripted testing should also be allowed for. This should ideally be undertaken by real users of the system, since they will bring to it the true user's viewpoint. They should be given free rein to do whatever they want to do, but should have had adequate notice and training so that they will do something sensible. They should also appreciate that the system should correspond to the Requirements Specification and not necessarily work the way they think it should work.



Results of Acceptance

- **Passed - Supplier wins?**
- **Failed - Customer wins?**
- **Draw - Passed with reservations?**



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Problems identified during the Acceptance Test need to be recorded and analysed, with a decision regarding the *acceptance* being taken with due care. There are three main possible scenarios:

- Yes, the system has passed without qualification (rather rare).
- Yes, the system has passed but with provisos as detailed, provided that they are cleared within a given time.
- No, the system has not passed; the reasons for the failure are listed and detailed.

In many cases, reaching agreement is not clear cut. The importance or criticality of the problems can often be difficult to establish objectively, as many individuals tend to become emotionally involved during this phase. It is important however, that the decision is reached by weighing the various factors in the particular circumstances as objectively as possible. This is why it is important to establish and agree the *success* or *acceptance* criteria during the early stages of the project.



What Next?

- **Assess new risks**
- **Review and agree support agreement**
- **Ensure change control applied**
- **Ensure problem resolution process and communication lines established**

Before the system goes live it is necessary to review the risk assessment process undertaken prior to the development to ensure that no new risks to the operational performance of the system have been identified. If any have been identified, then steps need to be put into place to remove these risks or reduce the effect of them.

As each release of software or system is issued to a customer or group of users, it is necessary to assess their acceptance or satisfaction with the new functionality against criteria that were agreed during the Requirements Specification processes.

The supplier should be able to assume that the system and software will be operated in its intended environment and in the specified way, and that when problems occur, they will be notified promptly with accurate information. Any problems identified, should be dealt with using an agreed problem resolution process.

Dependent on the terms of the contract, the customer should be able to assume that the supplier will monitor, record, and respond to all user requests and problems relating to the software.



Summary

- **Keep terms realistic**
- **Get help when needed**
- **Work together to achieve joint aims**



To summarise, when dealing with suppliers and subcontractors, it can be very easy to resort to battleground tactics. This must be recognised early on during the acquisition, and everything possible undertaken to achieve and maintain a working relationship.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

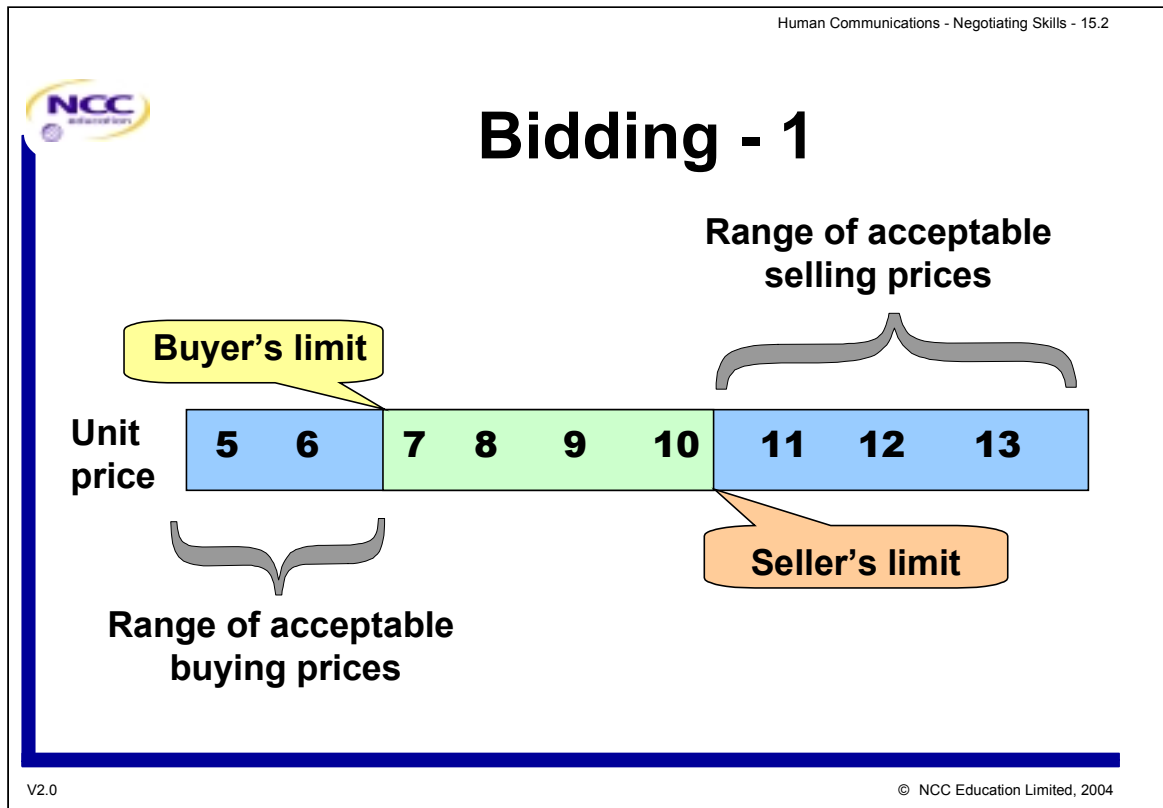
Lecture 15 Human Communications - Negotiating Skills

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We are all negotiators. Negotiation is a process of joint decision making, where the parties have differing preferred outcomes. Give and take are natural every day elements of life, and much of this represents negotiation of some form. It may be to determine a purchase/sale price of a product; or to negotiate a greater amount of budget to undertake a required task. The object of negotiation is not restricted to financial units – time may also be negotiated.

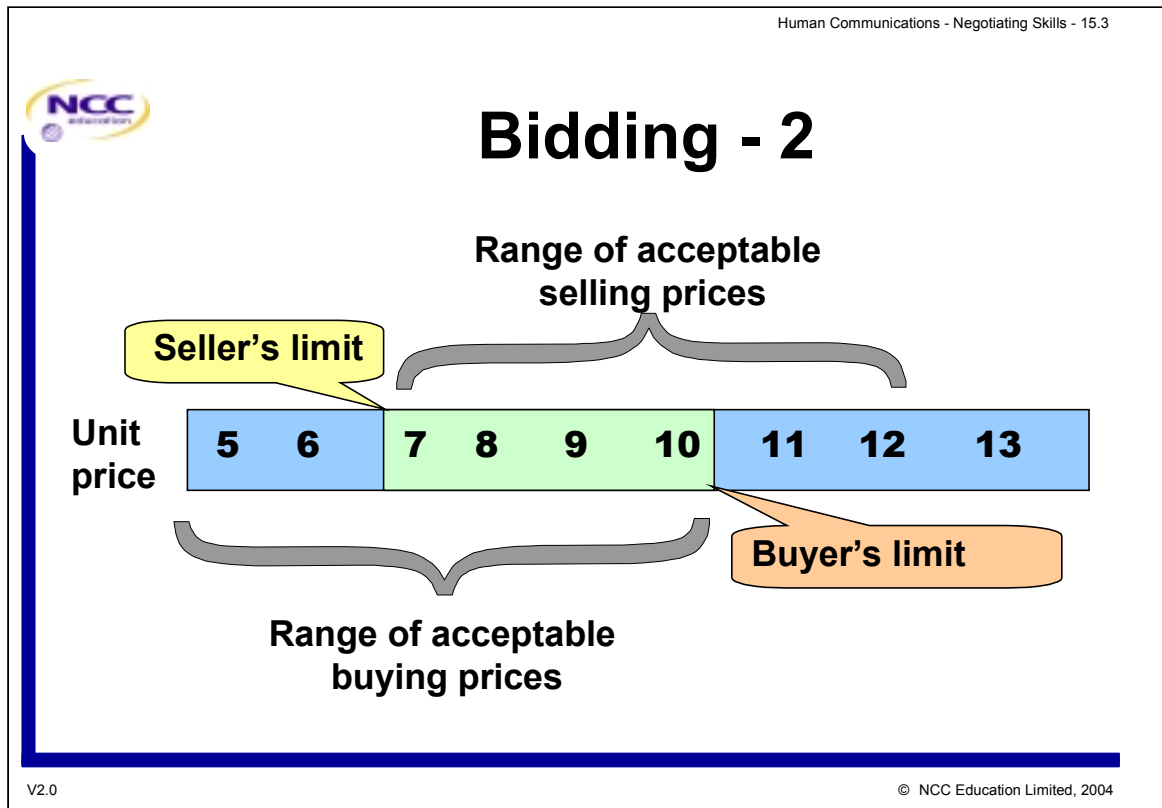
Some people are better negotiators than others and, consequently, are more successful in terms of achieving their desired outcomes.



When people begin to negotiate they normally have some idea about the level of benefit that they hope to secure. This is their *target* outcome. They also have some idea about the level of benefit below which they will not go. This is their *limit*.

Negotiation is not necessarily a win/lose situation, but if both parties enter into negotiation when their criteria are as shown on this visual, then unless both negotiators have the strength to stick to their limits, someone is bound to lose.

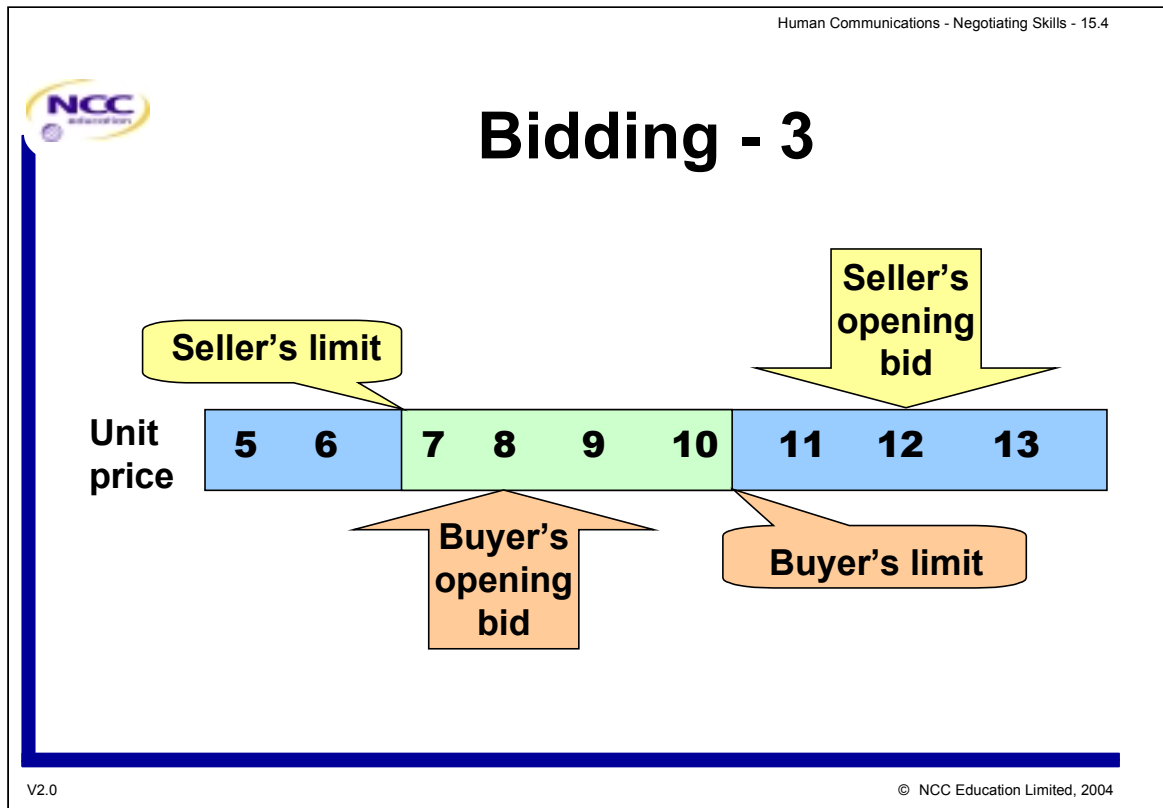
The lecturer may wish to discuss "How might one establish that this is the scenario, and are there any circumstances which warrant negotiation?"



This is a more reasonable starting point, where a settlement is almost certainly possible, and the final price will be determined by the skill of the negotiators:

- If the seller has the greater skill, then the price will be nearer 10; if the buyer has the greater skill, then the price will be nearer 7.
- Skilled negotiators attempt to discover their opponent's limit. To push an opponent beyond his limit will lead to a breakdown in the negotiation.

The competitive negotiator seeks to secure an agreement as close to his/her opponent's limit as possible, thus maximising his/her own benefit. To achieve this outcome, skilled negotiators need to know how to research their opponent's case before coming to the negotiating table and, during the negotiation must be skilled at probing and listening, so that all available information is gathered and can be used to maximum advantage.

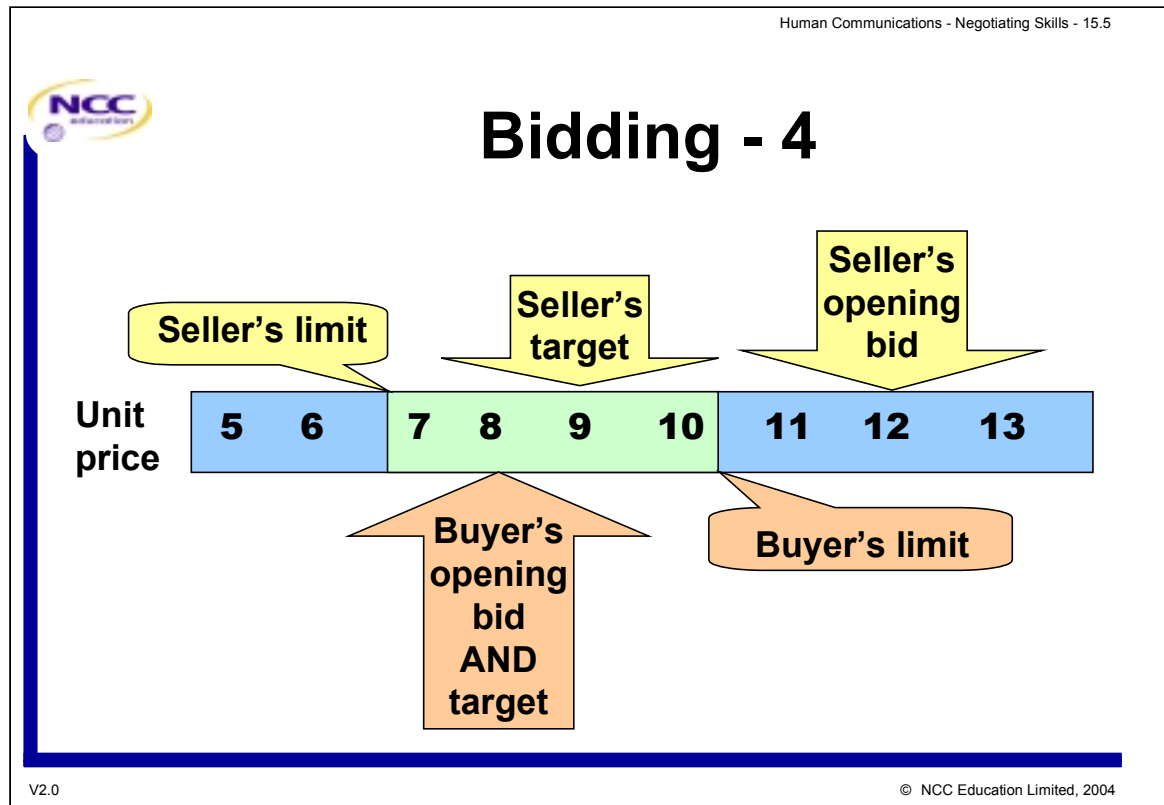


Opening bids are important.

Unskilled negotiators can weaken their position considerably by making inappropriate opening bids. If an opening bid above the seller's limit is made by a buyer, then it will be almost impossible for them to reduce their bid in a subsequent negotiation (even if they discover the same product is being bought by another organisation at a lower price).

The normal convention in negotiations is that the opening bid does not represent the final position and that some concessions will be made. However, each party attempts to convince the other that their opening bid is, in fact, very close to their limit and they have very little room to make concessions.

Skilled negotiators are able to employ tactics that help them to convince their opponents that they must concede if an agreement is to be reached, and are able to counter similar tactics when these are employed against them.



Given negotiation conventions, and knowing that some concessions will probably have to be made, most skilled negotiators will make opening bids beyond their target. If the buyer's opening bid, as shown here, also represents their target, there is a strong likelihood that the final settlement will yield less than their target benefit.



Negotiation Process

- Preparation
- Climate setting
- Choice of strategy
- Definition of opening bids
- Bargaining
- Settling



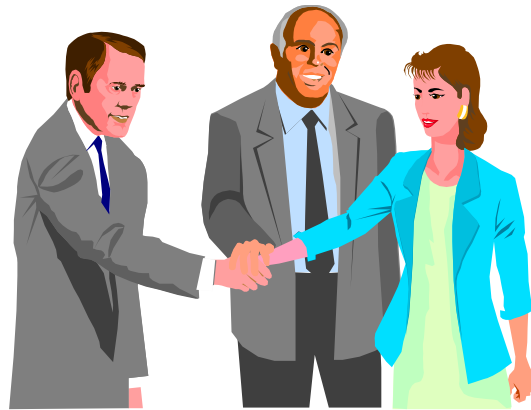
There is, however, more to negotiating than bidding and counter-bidding.

Some of the important stages in the process are listed here and will be discussed in the following visuals.



Negotiation Team

- **Maximum of 4**
- **Minimum of 2**
- **Mandate**
- **Communication**



A negotiating team is useful for larger, more complex acquisition projects.

Such a team should not be allowed to get too large. It should be given a clear mandate and should be the sole channel of communication between the two organisations during the process.



Preparation

- What do you want to achieve?
- How are you going to achieve it?

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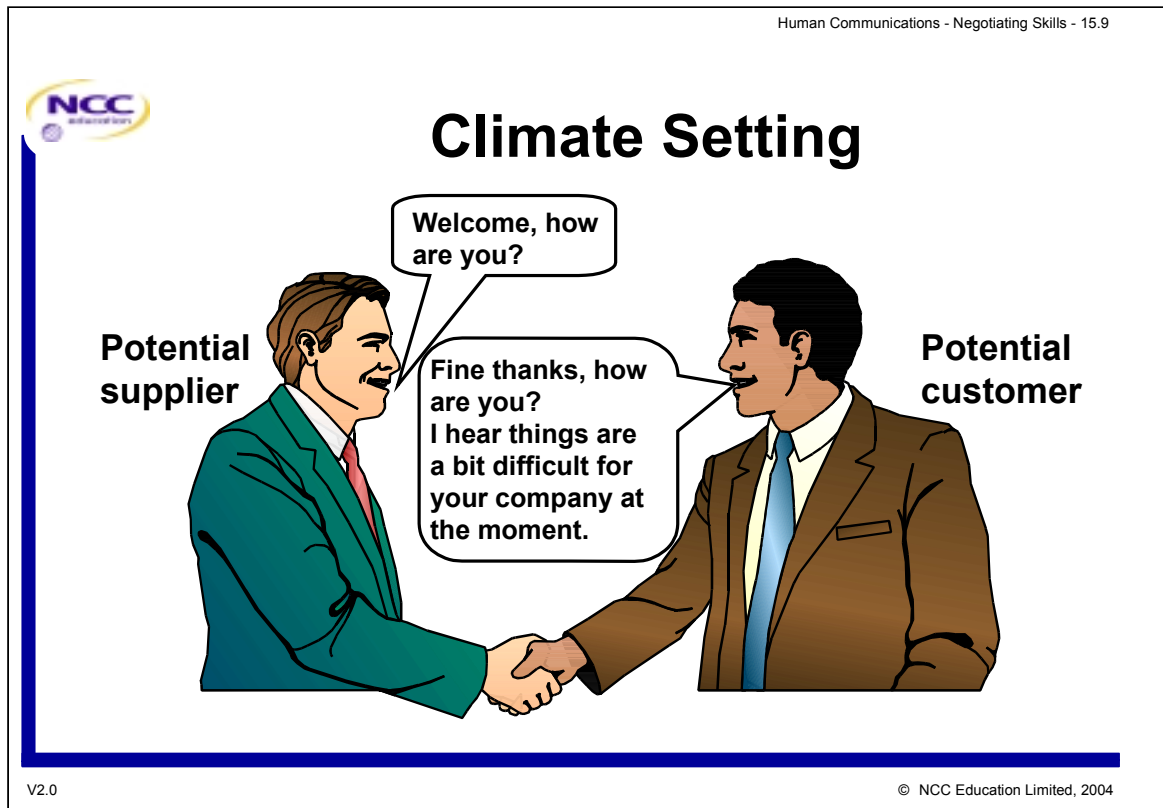
Preparation is about anticipation. Establishing what it is that you want, then attempting to guess parameters within which your opponent will be working.

Your case will be significantly weakened if you do not have the time to prepare properly.

It is important, at the outset of a negotiation, to have a clear idea about what is wanted and, therefore, what needs to be negotiated. Rarely are negotiations concerned with only one variable, such as price. Someone buying a car also needs to agree on the model, colour, delivery conditions (charges and timescales), payment terms, etc. It is not unusual for an individual to feel that they have negotiated a better deal on price than from another motor dealer, only to have the car delivered with no radio, interior mats, mud flaps etc., all of which they thought were part of the standard product.

Preparation not only involves thinking through *what* it is that the negotiator wants to achieve, but also *how* it is going to be achieved. This also involves undertaking some research regarding what the opponent wants, what concessions they would value, and how they are likely to go about getting it.

Predictions about how the opposition is likely to behave can help the negotiator plan an effective strategy.



People's behaviour can be interpreted in many different ways. Dealing with someone known to be trusted is very different from dealing with a stranger you are meeting for the first time.

When negotiating, especially with strangers, it is easy to get drawn into a competitive interaction where one party seeks to maximise his/her benefit at the expense of the other. Careful management of the initial encounter might increase the possibility of discovering a common purpose and establishing the trust that is necessary for collaborative negotiation.

Concentrating on the process can offer a relevant but neutral topic that provides a useful context for testing and manipulating the climate. This includes:

- *introductions* of the people involved;
- *purpose* of the negotiation;
- *agenda* for the meeting – topics, order, etc;
- *time* available for the current meeting and any other restrictions on time.



Choice of Strategy

Competitive

or

Collaborative ?



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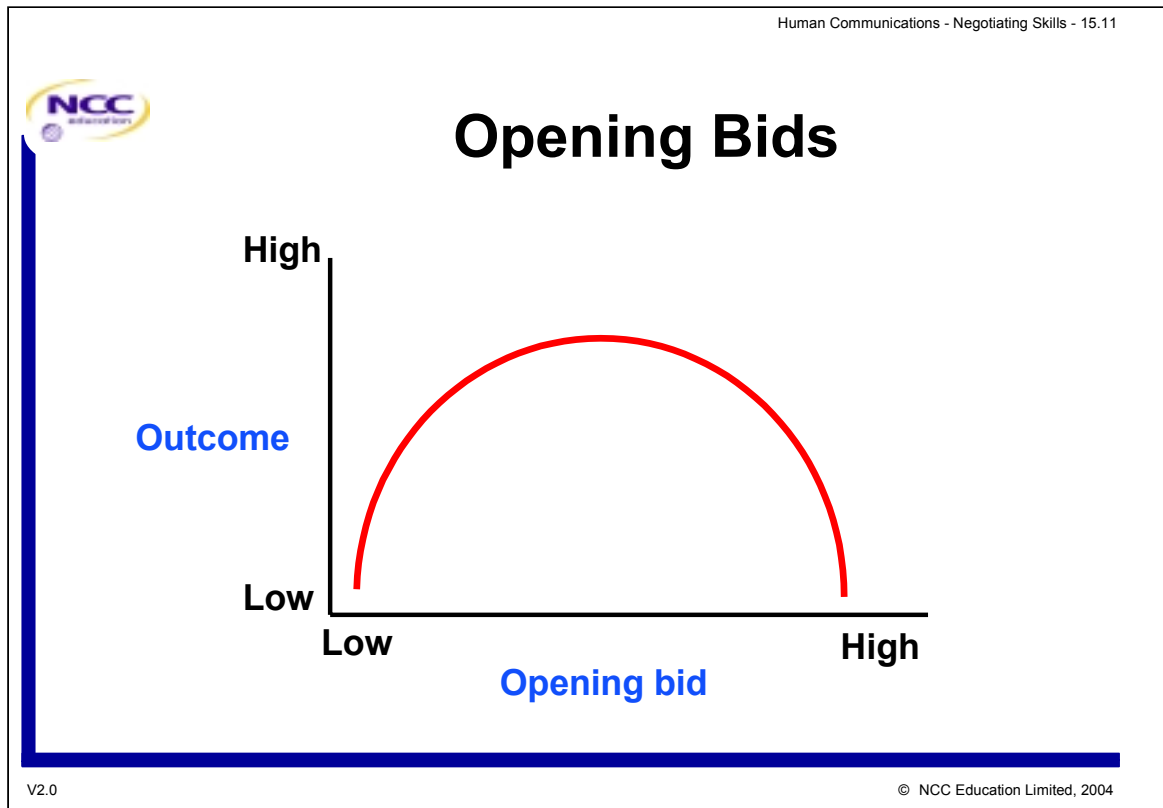
Negotiators with a high need to win are likely to err towards competitive strategies, especially if they feel that they are in a strong bargaining position. Competitive strategies are also likely to be adopted where one or both parties do not trust the other's intentions, where they feel that their opponent will exploit them and where they expect the other only to make concessions when forced. These will usually result in win/lose scenarios.

Skilled negotiators are more likely to favour a collaborative strategy, especially where two key criteria are satisfied. These criteria are:

- *trust*; and
- belief that a *mutually beneficial outcome is possible*.

In order to enter into collaborative negotiations, there must be an element of trust between the parties, as it is often necessary to disclose information about goals, priorities and limits to the opponent.

The mutually beneficial outcome may be the case when all parties believe that a problem solving approach might lead to a more beneficial outcome, or if each party controls resources that would cost little to give up but would have a high value for the other.



Whatever strategy is adopted, some consideration needs to be given to the opening bid. However in collaborative negotiations, it is more likely that the climate setting phase will assume greater importance.

Opening bids are influenced by several factors:

- The desire to protect the limit from detection.
- To provide room to trade concessions.
- To challenge the opponents expectation of the likely outcome.

This visual shows the relationship between the opening bid and the likely outcome.

If a seller's opening bid is too low, then the instinctive assessment by the buyer is likely to be:

“This is too good to be true, what is wrong with it?”

and suspicions about the object under negotiation will be raised. Especially where individuals are engaged in competitive negotiation, they are more likely to value an outcome if they have to work hard for it.



Bargaining - Competitive Tactics

- **Demonstrating a commitment to hold firm**
- **Imposing time pressure**
- **Reducing the other's resistance to making concessions**
- **Improving the relationship and the mood**
- **Creating opportunities to take time out and think**
- **Resistance and retaliation**

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There are several tactics that should be considered if entering into competitive strategy negotiations.

- Demonstrating a commitment to hold firm, can be achieved by indicating that there is no room for manoeuvre, or there is a limited mandate to negotiate. Small concessions, offered slowly, are more likely to reinforce this.
- Imposing time pressure, by persuading the other party to concede by increasing the perceived cost or risk of continued negotiation.
- Reducing the other's resistance to making concessions by attempting to shift the other's limit in a favourable direction, lowering the other's expectation of benefit to be achieved, and convincing the other party that they have underestimated the value of concessions already offered.
- Improving the relationship and the mood, as people tend to help people they like, identify with or depend on.
- Creating opportunities to take time out and think, as sometimes an unexpected opportunity presents itself or an opponent makes a move that puts the negotiator under pressure.
- Resistance and retaliation – indicating that the negotiation has broken down and the parties are heading for a lose/lose situation.



Bargaining - Collaborative Tactics

- **High versus low risk tactics**
- **Signals and hints**
- **Use of intermediaries**
- **Informal problem solving sessions**
- **Concessions**

Collaborative negotiation involves the search for a mutually beneficial agreement and as such depends on openness and a greater willingness to offer concessions. The risks therefore are different, and need to be managed appropriately, depending on the level of trust there is between the negotiator and the opponent.

- The highest risk tactic is to offer a large concession, in the hope that this will be reciprocated. If it is not reciprocated the negotiator will have substantially weakened their position.
- Signals and hints to suggest the possibility of concessions may be more appropriate, so the negotiator is less likely to lose image if the opponent does not reciprocate. Use of non-verbal communication techniques such as gestures may be used.
- Use of intermediaries, may be useful if there is believed to be a greater personality match between the intermediary and opponent than between the negotiator and the opponent.
- Informal problem solving sessions make use of opportune meetings such as lunch or in the lift! Because they occur outside the formal framework of the negotiation, they provide a greater opportunity to explore possible moves, and the opponent's reaction to them.
- Small concessions, followed by larger ones if reciprocated.

Human Communications - Negotiating Skills - 15.14

Settling

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This final process involves recognising when the other party is ready to settle and making or accepting a proposal that will form the basis of an agreement.

In a few cases a verbal summary will suffice, but more often it is necessary to ensure all the terms and conditions agreed during the negotiation process are written down – sometimes in legal detail. This emphasises the importance of ensuring that accurate notes of all the negotiation discussions are made.



Improving Negotiation Skills

- **Observe and recognise what is happening**
- **Identify typical approach**
- **Be clear about limits and target outcomes**
- **Do not underestimate importance of personality factors**
- **Know your own strengths and weaknesses**

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It is likely to be beneficial to your own skills in negotiating, if you are able to observe other parties negotiating. Try and keep a log of the discussion points, and find the threads through the process to the settlement.

Try to identify a typical approach that would favour certain tactics and ignore others – are you inclined towards being competitive or collaborative?

Ensure that you are clear about the limits for each circumstance, and what the target outcomes are – not only in financial terms.

Do not forget that some people have a strong need to win and enjoy the cut-and-thrust of competitive bargaining and have few scruples regarding concealment and bluff. Similarly others may have a strong need to be liked and a well developed sense of fairness.

Develop an aide memoir of key information that you can use in any situation.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 16 Resource Management - Acquisition and Contract Management

V2.0

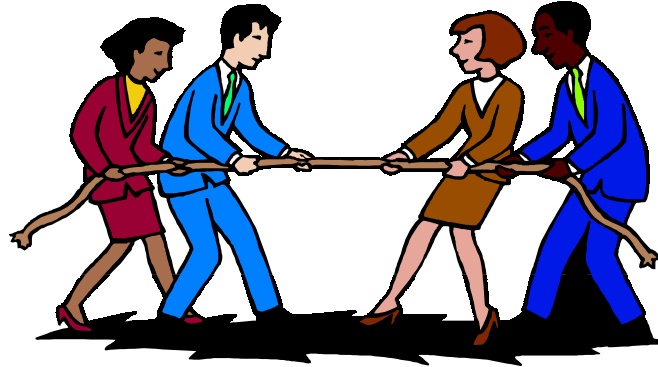
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This session looks at some of the issues surrounding managing contracts with external suppliers of Information System (IS) Solutions.

We look at the problems and causes of those problems, briefly touch on taking a risk management approach (*risk management is covered in slightly more depth in the Task Envelope session*), managing supplier relationships on an ongoing basis.



Typical Problems



“It’s not fit for purpose”
“It’s delivered late”
“It doesn’t fit together”

“We’ve spent our budget”
“Unrealistic lead times”
“You moved goalposts”

These are not the only problems, but they tend to recur with great regularity.



Typical Causes - 1

- **Poor specification**
- **Lack of quality assurance**
- **Weak test plan**
- **Inadequate acceptance criteria**
- **Poor project management**
- **No phased deliverables**

The underlying causes to the problems discussed are common worldwide, and are the exactly the same problems which can cause an internal development project to fail.

They can lead to much more severe problems, and become much more severe where a system is purchased from an external organisation. There are usually fewer corrective actions available to us under these conditions.

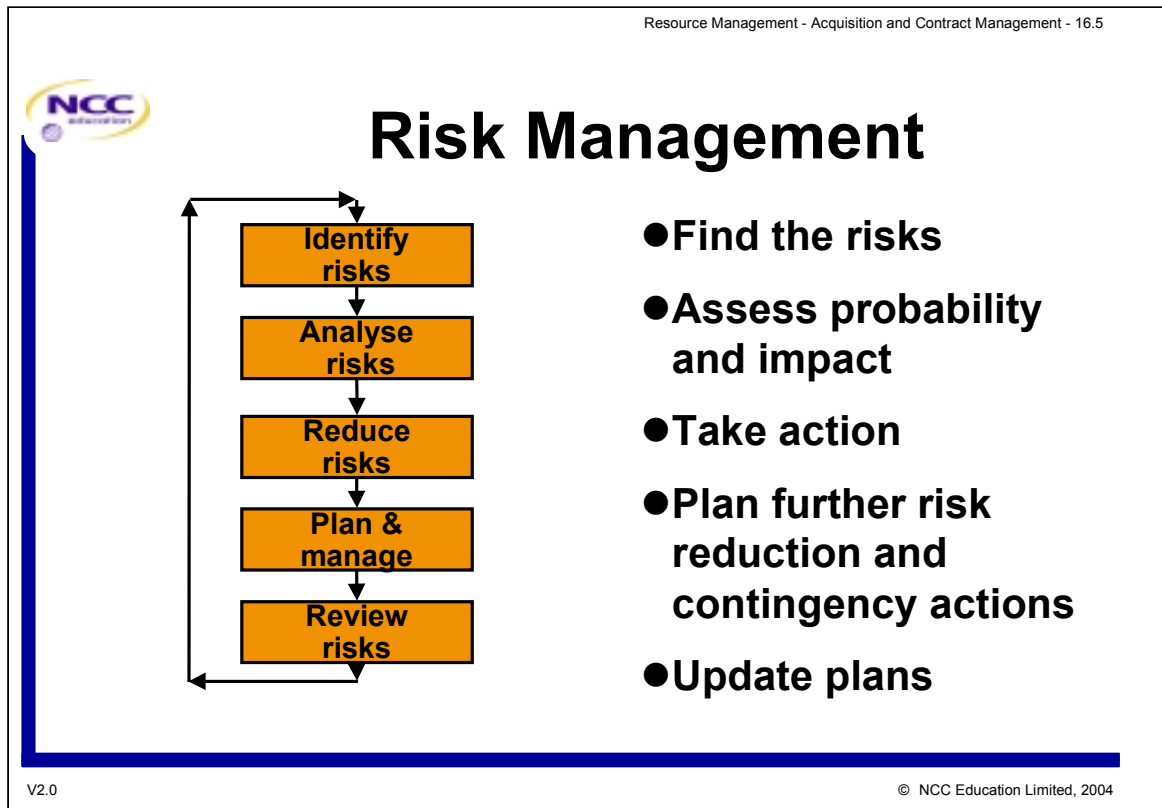


Typical Causes - 2

- Legal ramifications
- Poor/no change control
- Poor design
- Lack of standards
- Procedures not followed
- “But I thought ‘they’ were doing that!”
- Insufficient ‘front end’ work

These causes again reflect some of the typical reasons for failure in IS development projects.

Legal ramifications may arise with internal projects, but are extremely common with purchased software. It is absolutely essential to have an appropriate legal framework within which to purchase software.



Risk management has already been covered briefly in an earlier session of this module.

Identification of risks tells us nothing about how probable those risks are. We must make some judgements of those probabilities. By combining the impact or consequence of the risk by the probability of it occurring, we can gain an overall assessment of its seriousness.

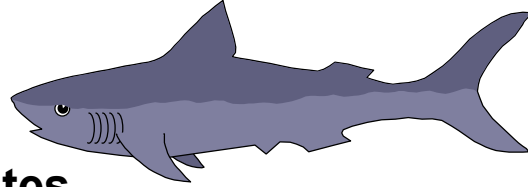
You may have identified and analysed many risks. Those risks that have scored highly should result in some immediate actions and an action plan which will help you to minimise the risk in the future.

Risks change, both in type and probability. It is important that we continue to monitor risks throughout the life cycle of the project, and the relationship with the supplier, repeating the cycle of actions as needed.



High Risk Areas

- **Ambiguity**
- **Usability**
- **Over/under estimates**
- **Varying levels of compliance**
- **Assumptions**



Experience shows that there are certain key areas which generate most of the risk in software acquisition. These may vary from culture to culture and between different industry sectors.

Problems of interpretation and usability are usually caused by inadequate requirements specification.

Poor estimation on the part of the supplier is either a product of their lack of experience in the application area, or more frequently, a by-product of the tendering approach. It is unfortunate that the software industry often relies on competitive fixed price tendering. This results in suppliers either purposely or unconsciously underestimating work in order to win the contract. Some less scrupulous suppliers may take the view that once they have won the contract with a low price, they can recoup their margins by exploiting customer lock-in when it is necessary to change the requirements – as it nearly always is!

Other rich sources of risk are the assumptions that both supplier and customer make about the requirements, the contractual arrangements and the relationship.



Risk Reduction

- **Phased deliverables**
- **Incremental commitments**
- **Staged payments**
- **Contingency plans**
- **Supplier approval process**

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Approaches to reducing the impact of the identified risks are again dependent upon the type of purchase being made – and the maturity of the relationship between the customer and supplier.

This visual lists some of the ways that the common major risks can be avoided or reduced.

- *Phased deliverables* – to ensure that progress and quality is continually being monitored.
- *Incremental commitments* – to ensure that the users are kept involved.
- *Staged payments* – to maintain cash flow of the supplier – so your project is not given a lower priority than it needs.
- *Contingency plans* – be prepared for the worst! If the worst case scenario occurred, what would you do about it?
- *Supplier approval process* – ensuring that you only deal with suppliers that you can trust, and will provide appropriate visibility of progress and product.



Contract Legal Issues

- Copyright
- Patents
- Non disclosure

Some contractual issues that require to be established for any contract that relates to Information Systems solutions and services – especially where the procurement of software is involved must include:

- Copyright.
- Patents.
- Non-disclosure or confidentiality.



Copyright

- **Berne Convention**
- **The creator is the default owner of copyright**
- **Payment for work does not automatically transfer copyright**
- **The execution of software involves copying**
- **Infringement can arise from partial copying**

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As agreed under the Berne Convention to which many countries subscribe, software is considered to be literary works.

- There are other conventions, and in some countries none at all.
- What is the copyright law in YOUR country.

Under the Berne Convention, the creator is the default owner of copyright, but under usual employment conditions it is the employer of the creator that owns the copyright – but this can vary depending upon the place and time of creation.

Payment for work does not automatically transfer copyright – an agreement is necessary.

The problem is further compounded by the fact that the execution of software involves copying program code from disk etc. to RAM, if backup copies are usually necessary – so some copying must be catered for.

Infringement can also arise from partial copying.



Patents

- **A right over an invention**
- **In UK software cannot be patented**
- **In US software can be patented**
- ***What is the situation in YOUR country?***

A patent is a right over an invention which prevents others from making or dealing in the invention without the owner's consent.

- In the UK software cannot be patented:
 - but *devices* incorporating software might be;
 - device can be interpreted very widely.
- In the US software can be patented:
 - this is very controversial;
 - US patents can affect developments internationally.



Non-Disclosure - 1

- **There is no automatic right of confidentiality!**
- **You must have an agreement to cover this**

There is no automatic right of confidentiality!

It is necessary to have a documented agreement to cover this.



Non-Disclosure - 2

Define

- Who is involved
- What the confidential information is
- Why it is confidential
- Any exceptions
- Time limits
- Is the non disclosure agreement subject to non disclosure?

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It is necessary to define:

- Who is involved – identify the parties concerned.
- Explicitly identify the confidential information.
- Why it is confidential.
- Any exceptions to this.
- What the time limits are.
- Whether the non disclosure agreement is subject to non disclosure.

Resource Management - Acquisition and Contract Management - 16.13

Managing Supplier Relationships - Working Together



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As we have seen, maintaining a good relationship with a supplier of Information System services and software can be fraught with problems, much more so than for a normal customer/supplier relationship.

Resource Management - Acquisition and Contract Management - 16.14

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Why Work Together?



But which is which?

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Consider the following points:

- If a larger and stronger customer deals with many small Information System suppliers – what is likely to happen?
- Why not simply impose such stringent conditions on suppliers that all the risk is carried by them?
- This could be taken further; why not insist on penalty clauses such that the customer could not lose financially from any possible outcome.
 - Do you think this is possible?
 - Do you think it would solve the problems?
 - What happens when a big Information System supplier tries to do this to a smaller customer?



Consequences of Taking Advantage

- **Resentment**
- **Strict interpretation of agreement**
- **Rigidity**
- **Little mutual stake**
- **Little supplier responsibility**
- **Active commercial response**
 - unwillingness to do it again
 - engineer future costs
 - win it back on the modifications or other 'extras'

Many customers have taken the approach of total risk transfer. Even if benefits are seen in the short term, the effect is usually counter-productive in the medium to long term.

One likely outcome is the strict interpretation of agreements by the supplier. This means that every minor variation from the agreed specification (and there are usually many) will be the subject of a new negotiation. The supplier will quite naturally seek to minimise his possible loss from the project. The time required to maintain and update this aspect of the relationship can quickly overwhelm project management.

The supplier has little stake in a one-sided relationship. Their motivation is simply to provide what is strictly required at the minimum cost. The supplier will have no interest in repeating the relationship if other opportunities present themselves.



Results of Poor Supplier Relationships


- **Poor quality**
- **Late delivery**
- **Cost over-run**
- **Excessive management time**
- **Disputes**
- **Impact on company image**

The problems which often occur as a result of a poor supplier relationship are manifested in a number of different ways.


These problems are the same as those which can result from poor specifications, or inadequate management of the acquisition from the customer end. There is often a temptation to blame the supplier for all such difficulties.

Disputes cost money. They inevitably cause delays in projects. They can eventually result in reluctance on behalf of the industry to do business with a customer.

Resource Management - Acquisition and Contract Management - 16.17



The Legal Solution?



- But - costs can escalate out of control
- Who gains?
 - Consultants make lots of money
 - Lawyers make even more

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It is necessary to have a good legal basis to the purchase of Information System solutions. Agreements help to define unambiguously the relationship between supplier and customer.


The problem is that reliance solely on law to avoid problems usually fails. There is little point in having an agreement unless you are prepared to use it. Unfortunately if you have enforced an agreement to the extent of taking action against a supplier, the costs of so doing quickly escalate. You may need additional legal input, expert reports and other expensive professional input.

It may take many years before a dispute is resolved in court. Normally the supplier will cease work as soon as the dispute becomes serious.

- *What is likely to happen to your project in the meantime?*
 - It will effectively come to a halt.



Managing Supplier Relationships

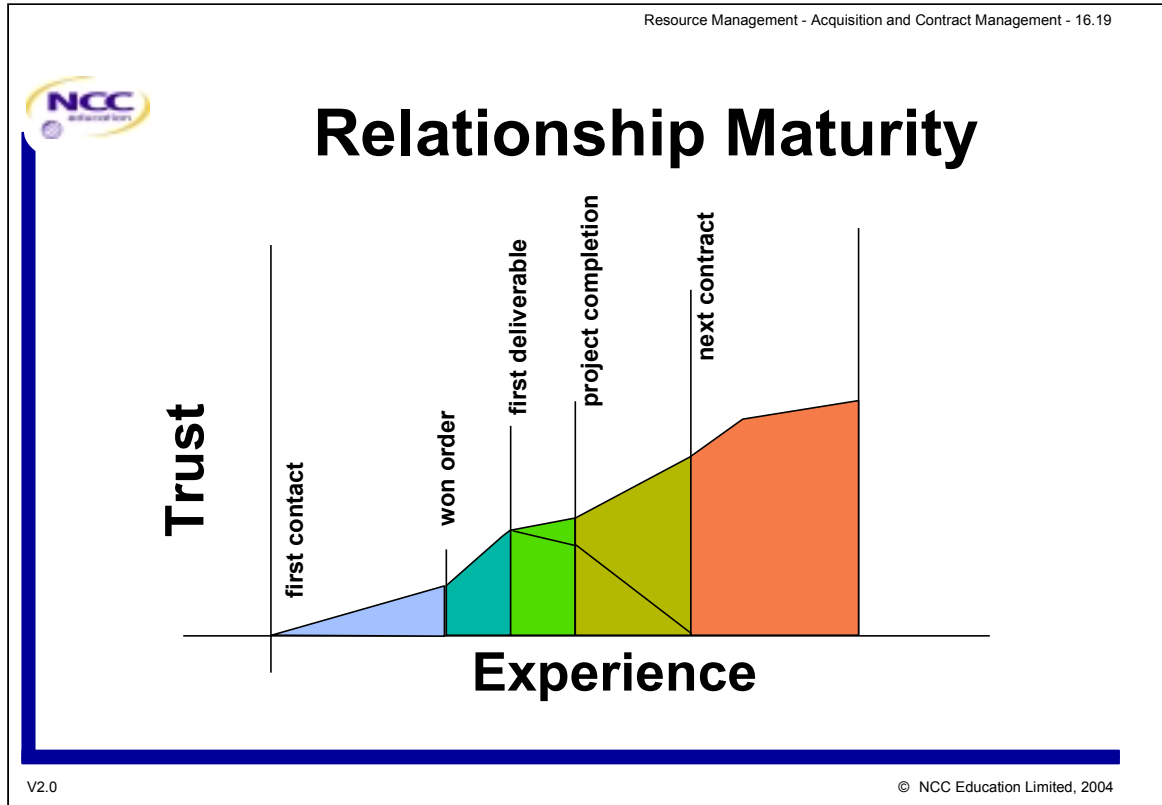
- Relationship maturity curve
- Analogy with customer relationships
- Small suppliers
- “Would  like it ?”

How should we manage the relationship in order to have the greatest chance of success?

It is important that we define effective channels of communication between suppliers and customers. This should be between the key players in both companies.

We should recognise that we have invested a very significant level of resources by the time we reach the point at which we place an order with a supplier. The investment is greatest when we deal with a new supplier, and the risks are correspondingly high. We would like to gain the best return from that investment by being able to repeat the process for subsequent orders. This should also minimise risks, since we should know a great deal about the previous performance of the supplier.

One way of appreciating the value of this approach is to consider the situation if the roles were reversed. If the nominated customer was a small supplier, how would they wish to be treated so that there was enthusiasm to repeat the process with another project.



One way of thinking about this investment in a relationship is to consider how it can mature over time.

There can only be a limited degree of trust between a supplier and customer at first contact. This should grow through the process of negotiation to the point where the order is placed. (If you were not confident – why place the order?)

As the first deliverables are received, the level of trust and confidence should hopefully rise significantly. (The converse is also possible.)

By the time the project is completed, both organisations have invested significant time and resources in the relationship, and that relationship has been tested. The level of knowledge of the supplier is now high and, assuming the experience has been good, should result in repeat business.

The cost of placing that repeat business should be significantly lower, since we now have real knowledge of the supplier. Similarly, the supplier may be able to make a more competitive bid, since they understand the risks of doing business with you, the customer, and they understand at least some part of your operation at a detailed level.

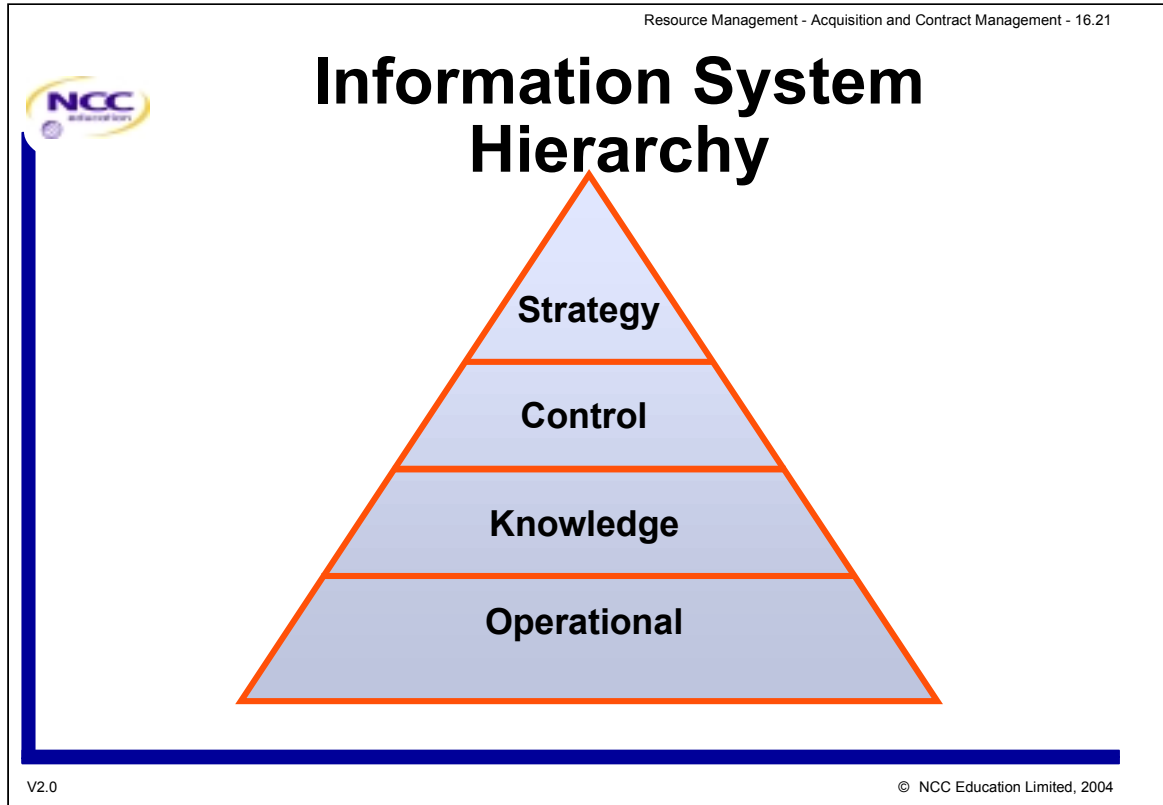
The question we should ask is *what level of investment are we prepared to make to gain these advantages*. It may not be appropriate for every system or every supplier. What is needed is some way of ranking opportunities for investment in a supplier relationship.



Defining the Relationship

- **What kind of relationship is appropriate?**
- **What investment are we prepared to put into the relationship?**
- **What expectations do we have for the future?**

We should consider these questions before we spend significant resources in a supplier/customer relationship.

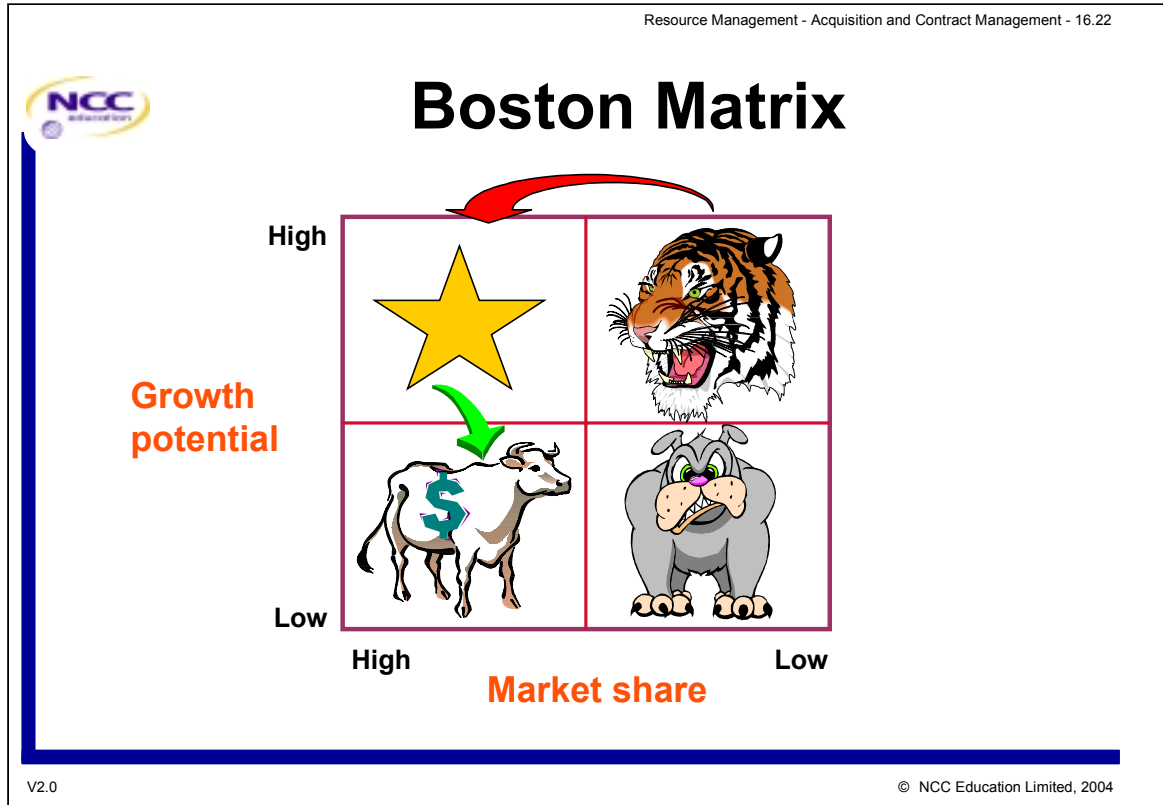


One approach we can use to decide which relationships should receive significant investment is to consider the nature of the application.

This visual shows systems as belonging to a hierarchy, depending on the level at which they are used in an organisation.

The higher up the hierarchy the application resides, the greater the amount of investment it is worth making.

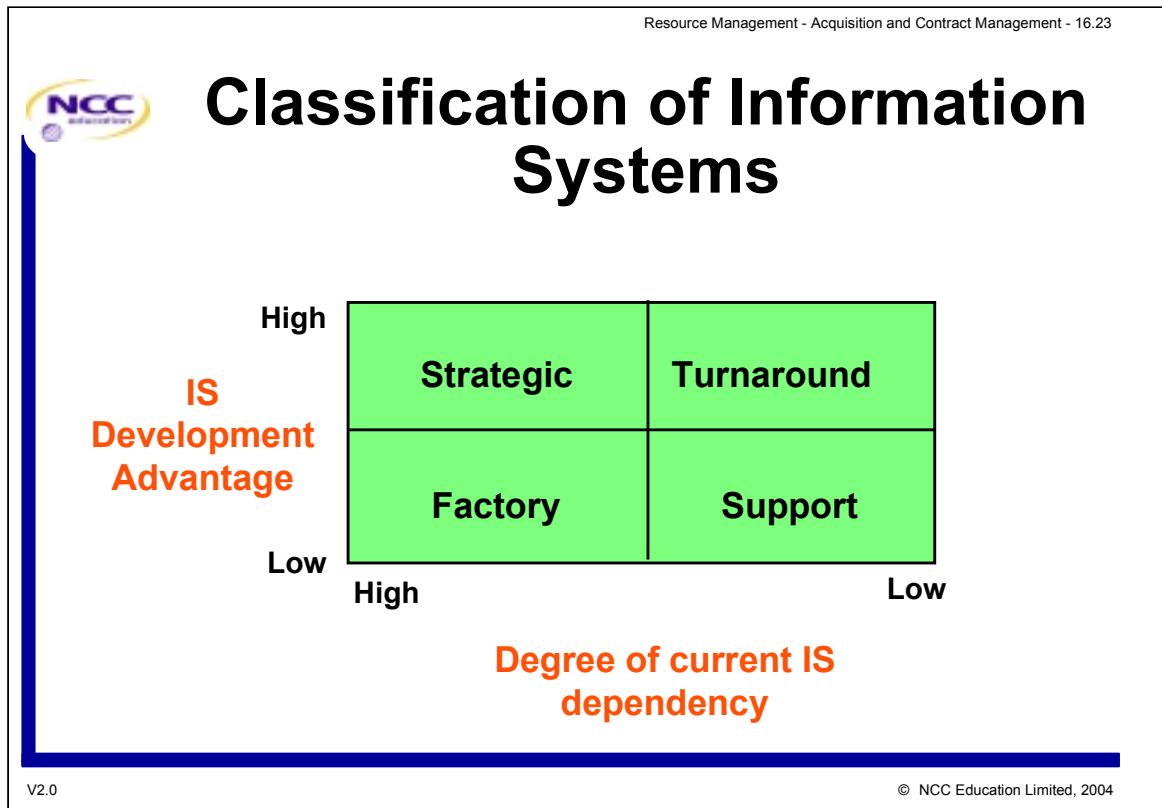
- *Senior management*: Set objectives, decide resource level, determine policy.
- *Middle management*: Assure the resources are effectively and efficiently employed.
- *Operational control*: Ensures that the detail of the work to be performed is efficiently monitored.



We can also classify systems themselves according to their investment potential using the Boston Matrix (Boston Box) Analysis:

- *Wild Cats* have enormous potential, and associated risk. We accept that the majority of wild cats may fail, but those that succeed can have a dramatic effect on the organisation.
- *Stars* are systems which are growing in importance, with plenty of future potential. They need the maximum investment. In supplier relationship terms, these are the *partnerships*.
- *Cows* are systems which continue to provide good returns, but have no future potential for growth. We should invest in these only to the extent of maintaining them.
- *Dogs* are systems with no growth potential and small returns. We should minimise investment in such systems or the supplier relationships which they represent.

There is a natural progression of investments. If we correctly identify Wild Cats we can turn them into Stars which will eventually settle down into Cash Cows.



Yet another way of thinking about systems and the degree to which we might invest in supplier relationships is shown by this matrix. It is functionally identical to the Boston Matrix but the terminology is more like that used in the hierarchy shown previously.



The Prisoners Dilemma

- Non zero-sum game
- Tit for tat

	Co-operate	Defect
Co-operate	3,3	0,5
Defect	5,0	1,1

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Another way to view the supplier customer relationship is through the *Prisoners' Dilemma*. This is a famous theoretical game which models many aspects of relationships between two or more organisations. It was originally used by the Rand Corporation to model US/Russian options during the Cold War.

The essence of the Prisoners' Dilemma is that it is a non zero-sum game. This means that it is possible for both players to win, or both players to lose or one player to win at the expense of the other. The name of the game is derived from the dilemma faced by two conspiring criminals picked up by the police. The prisoners are interrogated separately. If a prisoner admits his guilt and informs (defects) on the other he will get a light sentence. If both prisoners say nothing (co-operate), they will both be freed. If both admit guilt (defect), both will be punished, but more lightly. If a prisoner does not admit guilt but his partner does the first prisoner will be punished very severely. This is summed up by the pay-off matrix.

It is easy to establish the optimum strategy for a single round. The problem of determining the optimum strategy for the iterated (repeated) Prisoners' Dilemma remained (and remains) intractable. The iterated game is interesting because it is assumed that both players can maintain total knowledge of all the previous rounds and can employ any strategy to determine their next move.



The Prisoners Dilemma

- Non zero-sum game
- Tit for tat

	Co-operate	Defect
Co-operate	3,3	0,5
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In order to find some good strategies, the US government decided to mount a computer tournament in which programs played each other. Any strategy (in the form of a computer program) could be entered, and many were, including some extremely complex systems. There were no real limits placed on the size of programs or the time for computing a move, or the amount of data available in advance or generated during the tournament. The winner of the contest was a strategy called *tit for tat*, (entered by a Canadian psychologist) which was, incidentally, the simplest strategy of all and needed about six lines of code.

In this strategy the player always co-operates first, then does whatever the other player did in the previous round. Despite its simplicity, this strategy won because it tended to manipulate the relationship into mutual co-operation even if the other player occasionally defected.

The result surprised everyone. A second tournament was arranged for the following year. This time everyone knew that *tit for tat* was a good strategy, but the result was still the same, *tit for tat* won. Even more surprise! A lot of theoretical work has been done on this since!

There is a parallel here with the supplier/customer relationship. Clearly the best strategy is not to co-operate under all circumstances, since this will be realised and exploited. Given that we want to make the best use of our investment in the relationship, we want to manoeuvre the supplier into mutual co-operation. *Tit for tat* is a reasonable model to use in achieving this goal.



Communication with Suppliers

- **A single, clear and enforced channel**
- **Make use of a Service Level Agreement**



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Last, but not least, it should be recognised that it is critically important that communication with suppliers is through a well defined single channel. Problems have often occurred when the supplier chooses the channel in order to maximise their advantage.

It should also be remembered that all communication with the supplier should be in commercial confidence (in both directions).

Service Level Agreements are covered in the session on Managing Internal Resources, as they can be used both for internal and external purposes. The basis is to ensure that both parties agree to the terms of the relationship and that the results of the relationship are measurable in quantifiable terms.

Principles of Human Behaviour - Leadership - 17.1



**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 17
Principles of Human
Behaviour - Leadership**

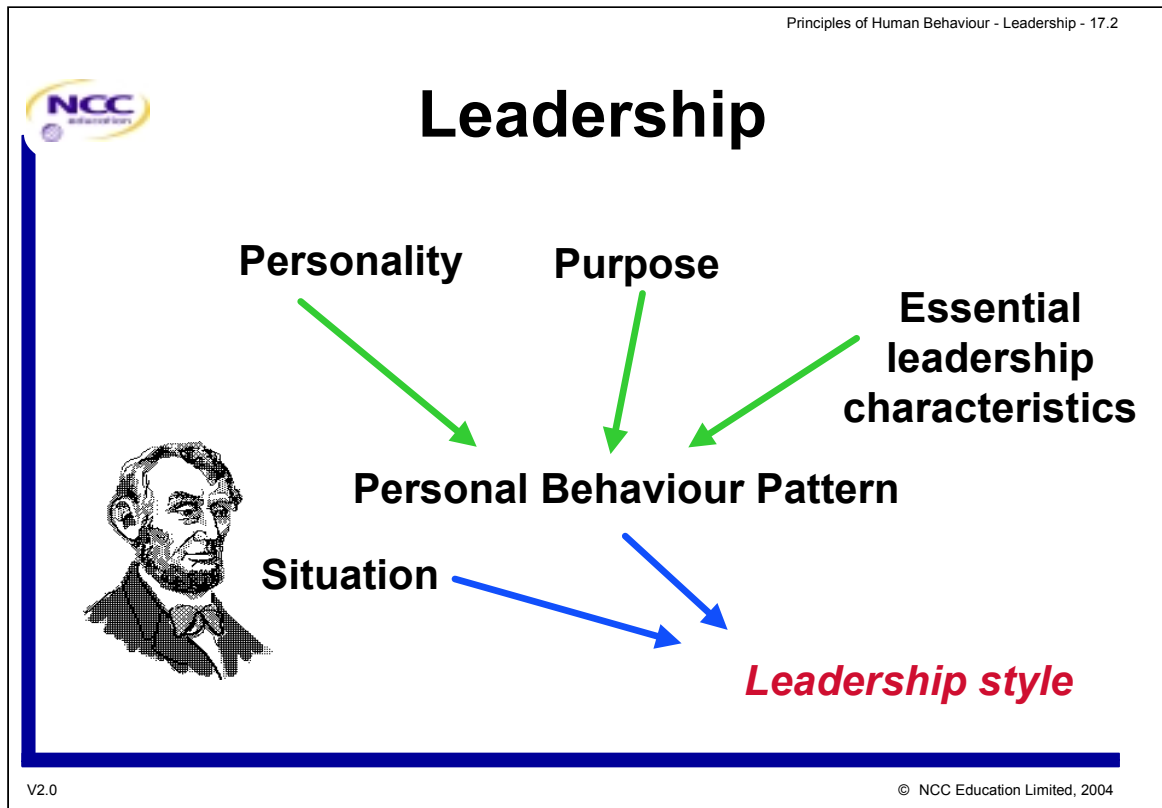
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This session looks at the nature of leadership and teams, describes the various leadership styles appropriate to team management.

We also discuss the principles of motive and motivation, and describe the most relevant theories of motivation in the work environment. It discusses the concepts:

- What are motives?
- What is motivation?
- Why does it matter?

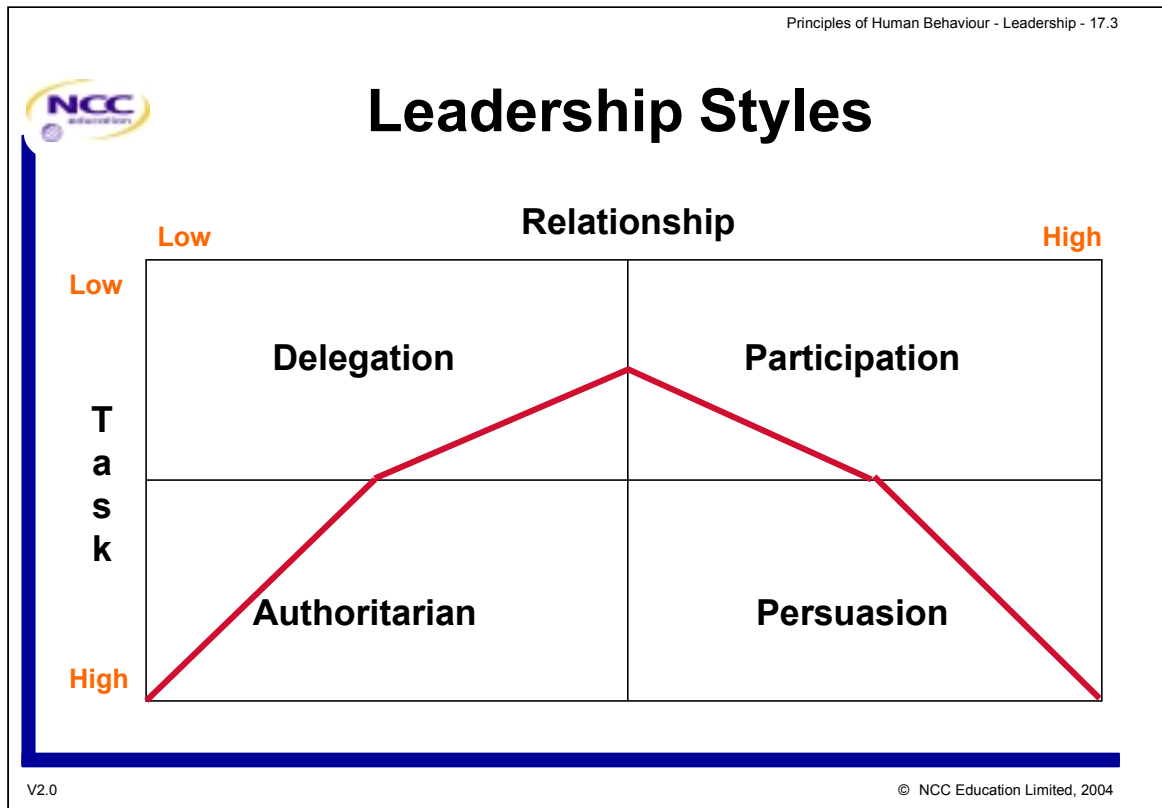
We also discuss the various learning styles, and undertake a self-assessment exercise – to determine our own preferred learning style, and how that affects the way we behave with others.



Students should consider leaders who they feel have been very effective in the past. The common general characteristics of these leaders will almost certainly include:

- single-mindedness – almost to the point of stubbornness;
- excellent communication skills;
- self-belief;
- very strong sense of purpose;
- charismatic – in the sense that they found it easy to attract a following.

Note that this list does not mean that all of them were necessarily *good* – contrast, for example, the lives of, say, Martin Luther King and Hitler – but it does show that these essential leadership characteristics are displayed in conjunction with the personality of the leader. The leader's behaviour will demonstrate how that personality applies itself alongside the chosen purpose to give a behaviour pattern in a given situation, with a leadership style ensuing from this.




There are many ways of categorising leadership style; one useful method is to look at the way in which the importance of relationships are set against the need to complete the task.

- High task orientation, low relationship orientation – “I don’t care about the people, I just have to get the job done” – will result in an authoritarian style, where the leader simply tells people to do the task without regard to their view of it.
- Low task orientation, low relationship orientation – “I see this task as unimportant, uninteresting or beneath my dignity, and I don’t care about who does it” – will result in an approach which either delegates or gives away the responsibility for the task altogether.
- Low task orientation, high relationship orientation – “I am not particularly concerned about the task, but relationships with the people for whom I am asked to do it, or who I am doing it with are important”, will give rise to a participatory leadership approach.
- High task orientation and high relationship orientation – “The job needs doing, but I care about building an ongoing relationship with the team as well” will result in an approach in which the team is persuaded – given an *incentive*, a motivation, and perhaps also a rationale for doing the task (the team possibly even being part of the process of objective setting).

Motives and incentives are to be examined in a little more detail later on in this session.

Principles of Human Behaviour - Leadership - 17.4



Leadership and Relationships

“Put your people first, above the board of directors, even ahead of the customers and above the world”

Sir John Harvey Jones

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The leader is employed to get a job done through people he/she has control over. Without them, there is no team to lead, and nothing can be accomplished at all. No matter how important are the customers, directors, or anybody else – if the manager does not lead the team, none of them will get anything delivered at all.

Sir John Harvey Jones, ex-chairman of ICI articulated this in the quote given on the visual – and the same view has been repeated by many other business leaders both before and since.



Leadership Conflicts

- **Achieve the task**
- **Build the team**
- **Develop individuals**
- **Achieve personal goals**

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The leader's responsibility, irrespective of the level of seniority, is to balance a set of objectives – and it may well be that there are conflicts between these which need to be resolved. A breakdown or neglect in one area will affect the others, and prevent the job from being done as effectively as it could be. The prime objectives of the leader are to:

- *achieve the task* – to get the job done by planning, allocating resources, controlling the work done, monitoring against the plan and taking the necessary and appropriate corrective action;
- *develop individuals* – attending to personal problems, praising individuals, giving status, recognising and using and continually working to improve individual's abilities;
- *build the team* – setting performance standards, maintaining discipline, building team spirit, encouraging, motivating, giving a sense of purpose and training the people as well as at all times working to improve communication with the group;
- *achieve personal objectives* – leaders should not forget that they themselves have a responsibility to their own career and personal objectives, and that no team wants to be led by a leader who does not show a degree of personal enthusiasm and ambition.



Managing Motivation

- **Definition of motive**
- **Theories of motivation**
- **Primary social motives**
- **Motivation at work**

The next part of this session, discusses the principle of motive and motivation, and describes the most relevant theories of motivation in the work environment. It discusses the concepts:

- What are motives?
- What is motivation?
- Why does it matter?



Motive


A motive is a thought pattern with feelings and values which leads to energised behaviour

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To be motivated is to be energised into action. Our thoughts precipitate our actions. Thinking, feeling and acting are three essential elements in motivation. We should look at each of the components of this definition in detail.

- *Thought* – “A motive is a thought...”; and is therefore *internal*, i.e. it occurs inside your head, and thus cannot be:
 - seen; touched; smelt; tasted; sensed,directly by anyone except the one who has the thought.
Motives are totally individual. One experiences them and is solely responsible for them. This is important; since motives are thoughts, one can learn to control them.
- *Pattern* – The stray, random thought which surfaces unbidden in your mind for a moment only to disappear is not a motive. Motives may arise singly, but they are not stray or random – instead they belong to a pattern. This pattern is recurring and may well have been present in childhood, i.e. a thought habit, which powerfully influences behaviour.
- *Feelings* – the literature of many cultures places the source of our feeling not in the head but in the heart. Despite the devaluing of subjective, emotional, sentimental and non-scientific language in modern culture, the heart still remains metaphorically the source of our emotions.



Principles of Human Behaviour - Leadership - 17.8

Feelings

Positive	Negative
●Aroused	●Rejected
●Challenged	●Fearful
●Excited	●Shamed
●In love	●Violated
●Protected	


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Feelings can be positive or negative, and are needed to transform the thought pattern into a motive. Alone they will never produce energised behaviour.

When a motive is present one feels different. Negative feelings are as much an indication of the presence of a motive as positive ones.

This is important. Motives do not necessarily make one feel good. To be motivated might mean that one is filled with fear, anguish or anger. Other motives might be wishes to avoid pain or punishment, hunger or death. However, without feelings, positive or negative – there are no motives. Feelings are necessary for the creation of motives.



Principles of Human Behaviour - Leadership - 17.9

Motives

Functional	Social
●Hunger	●Interaction
●Thirst	●Creativity
●Warmth	●Opportunity
	●Challenge

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Motives can be *functional* or *social*. A *functional motive* is a motive which relates primarily to bodily needs or functions such as hunger, thirst, warmth, *etc.* For example, passing a hamburger shop makes one feel hungry and begin to think about how long it was since the last meal, *etc.*

- The behaviour associated with a functional motive is often more compelling than a social motive, since the functional motive has to do directly with physical well-being and survival.
- A *social motive* relates to interactions with the world around, its opportunities, its challenges, and its people.


As an example of the difference, it is a functional motive if I think of satisfying my hunger with a three course business lunch and go off to my favourite lunch spot. The social motive may drive me to think I do not want to eat alone and invite three people to join me.

Behaviour is not a random response; it is a goal directed to respond to the opportunities created by the situation. If the thoughts and feelings cannot be translated into goals, then one is likely to become confused, frustrated or depressed.

Principles of Human Behaviour - Leadership - 17.10



Motivation - 1



MOTIVES
are
THOUGHT PATTERNS
coupled with
FEELINGS
congruent with
VALUES
which lead to
ENERGISED BEHAVIOUR

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The visual illustrates the ideas inherent in the definition of a motive and shows the flow that links motives and behaviour.

In this context, behaviour is observable action. People will often speak of somebody *being motivated* when extra effort is put into a task.

However, strictly speaking, all behaviour is motivated, even turning the page of a book.

The term *motivation* is widely misunderstood and misused. Phrases such as *she has lost her motivation for the piano*, are wrongly used to describe someone who is no longer behaving with commitment and energy. What exactly is no longer there? Behaviour is still there. She still plays the piano, but her playing is not of the same quality which caused us to describe it as *motivated*.

So, what is lost?

Behaviour is influenced by many variables – thoughts, feelings, values, energy, health, *etc.* – the person may have lost any or all of these, but what she has *not* lost is her motivation.



Motivation - 2

Motivation is the process by which thoughts are translated into goal oriented behaviour

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This leads to a definition of *motivation* as the process by which thoughts are translated into goal oriented behaviour, and this provides the key to the *why* of energised behaviour.

Motivation deals with the stimulus and response of human beings of all temperaments and backgrounds in all situations.

There is a real danger therefore in over-simplifying the subject. However, vital factors can be isolated to show how management practices can be modified to utilise new understandings of human motivation in relation to work, especially given the modern belief that work can be understood as a basic human need and a source of intellectual fulfilment rather than the commonly held view of work as some form of punishment.

New patterns of leadership are illustrating ways to structure jobs such that accomplishment contributes to the goals of both individual and organisation. Each investigator in the field of motivation has approached it in a different manner and concentrated on only a limited aspect of the total subject



Maslow's Principles

People malfunction because they cannot meet their needs through constructive and socially acceptable behaviours

Maslow's three principles:

- **People are 'needing' animals**
 - **As one need is satisfied, another will appear in its place**
- **A satisfied need does not motivate**
- **Needs can be thought of as arranged in a hierarchy of importance**

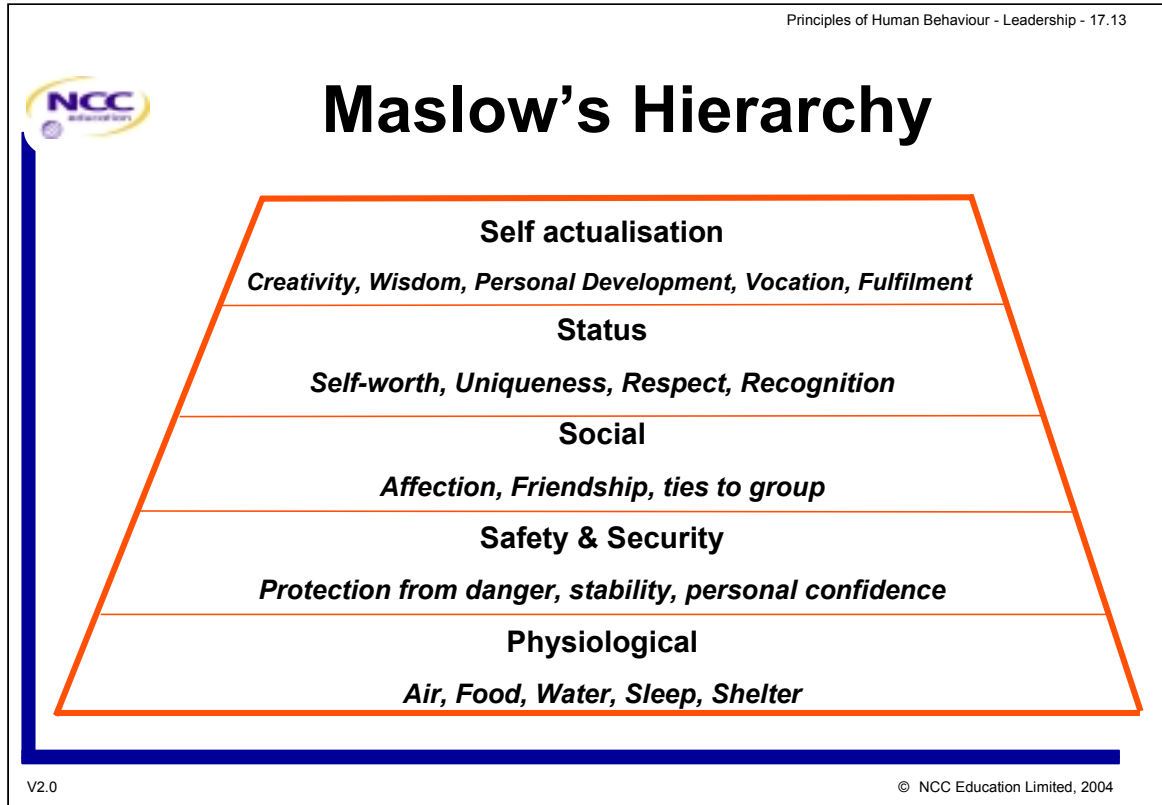
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Abraham Maslow, a behavioural psychologist, suggests that when people *malfunction* it is because they cannot meet their needs through constructive and socially acceptable behaviours. Managers must realise, he says, that employees work efficiently and produce beneficial results only as long as they are also satisfying their own needs.

Maslow states three principles that are still widely accepted as the foundation for research on human motivation:

- *People are needing animals.* They seek to satisfy their needs in a certain order. As soon as one need is satisfied, another will appear in its place.
- *A satisfied need does not motivate.* Only an unsatisfied need can provide motivation. A starving person can be made to do things in promise of food, but food will not motivate a person who is in the middle of his third day at a Roman banquet.
- *Needs can be thought of as arranged in a hierarchy of importance.* Each of us has a predetermined order of needs, each with its own rank and level of importance to each individual.



Maslow identified five levels of need, classified under two general headings: Primary needs (psychological and safety) and Secondary needs (social, esteem and *self-actualisation* or self-fulfilment). The visual shows these needs in their hierarchical relationship.

- *Physiological needs* – These are the basic needs to ensure survival, for example, food, warmth, shelter etc.
- *Safety needs* – These needs relate to remaining safe; in the industrial context, job security may be one of them.
- *Social needs* – These needs reflect a desire to feel loved and to belong. A feeling of being accepted as part of the team is an industrial aspect of this need.
- *Esteem needs* – The need to be held in esteem, a worthy and valuable colleague. Also the need for self-esteem. To have status.
- *Self actualisation* – A psychologist's *buzz phrase* which can be interpreted as 'What a man can be, he must be' – a painter must paint, a writer must write, a runner must run.

Maslow postulates that these needs are only motivators when they are unsatisfied. He further postulates that these needs work, roughly, in the kind of hierarchy described above. The lower order (primary) needs are dominant until satisfied, whereupon the higher (secondary) needs come into operation.



Maslow's Ideas

- **Maslow's ideas have important implications for managers**
- **An employee's first needs are to earn enough money to eat, live and achieve a reasonable standard of living**
- **Only when these needs are satisfied will he become concerned about needing to feel accepted, etc**
- **Therefore in order to motivate an employee it is important to assess his level of needs**

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There is considerable intuitive support for this idea. If you are starving, your needs for esteem or status will be unimportant; only food matters. When adequately warm, further heat will not motivate you, i.e. the need does not operate as a motivator.

The ideas postulated by Maslow have important implications for managers.

An employee's first needs are to earn enough money on which to eat, live and achieve a reasonable standard of living. Only when these needs are satisfied will he/she become concerned, progressively, about needing to feel accepted, desirous of esteem, and eventually, self-actualised at work.

It follows from this that, before trying to motivate an employee, it is important to assess the need level at which an employee is existing. For example, trying to persuade an employee that achievement of an objective will provide him with enhanced status, or job satisfaction, will have no motivational effect if he is worried that he is about to be made redundant; he is trying to satisfy primary needs (safety).

Similarly, more pay will not motivate an employee who has plenty of money, who is a respected and popular member of the team, but who needs new horizons and a fresh challenge. His primary needs are satisfied, and are no longer motivators; he is trying to self-actualise.



Maslow's Hierarchy - Theory Z

We move up and down the hierarchy on a daily/hourly basis

- **E.g. a well adjusted employee who is usually committed to his job, may well be obstructive if asked, at 12.30 pm, to take a late lunch**
- **After lunch, he will return to his usual need level, and be anxious to please again**

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The scenarios described above are (relatively) long term ones. It is worthy of note that we all move up and down the hierarchy on a daily, or even hourly, basis as well.

For instance, a happy well adjusted employee who is usually committed to his job and highly co-operative, may well be rude or obstructive if asked, at 12.30 pm, to take a late lunch. This uncharacteristic behaviour might be due to the fact that he missed breakfast, and is very hungry. He has temporarily descended to a lower level of need and is more concerned about eating (a primary need) than to impress (a secondary need). After lunch, he will return to his usual need level, and be anxious to please again.

This is also referred to as Theory Z. Theories X & Y are explained on the following visuals.

Principles of Human Behaviour - Leadership - 17.16



Hertzberg's Hygiene Factors

- Company policy
- Supervision
- Working conditions
- Salary
- Status
- Security
- Interpersonal relationships

Satisfiers?

or

Dissatisfiers?

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There are many other theories of motivation, all of which can be useful to the leader in analysing the most appropriate way of motivating the team. *Frederick Hertzberg* identified two sets of needs, *satisfiers* and *dissatisfiers*.

- *Satisfiers* are those needs that when met bring with them a sense of fulfilment and pleasure.
- *Dissatisfiers* (sometimes called *hygiene factors*) cause dissatisfaction when not met, but do not necessarily bring fulfilment when they are met.

Hertzberg's view was that satisfaction does not come from work related benefits, but from what an individual does – to give is more satisfactory than to receive, provided basic needs are met and maintained.

Additional wages, bonuses, tea breaks or holidays will not produce the additional spark that leads to sustained energised behaviour. However, the absence of an adequate living wage and a healthy working environment will result in low energy and morale.

Principles of Human Behaviour - Leadership - 17.17



Hertzberg's Motivating Factors

- **Sense of achievement**
- **Recognition**
- **Meaningful work**
- **Increased responsibility**
- **Opportunity for advancement**

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To provide motivation, Hertzberg suggests including in the work package a number of intrinsic factors designed to give the job a greater significance. The job holder thus receives increased motivation as a result of greater *self* and *external recognition*.



MacGregor's Theory X

- **People are lazy**
- **People lack ambition**
- **People are inherently selfish**
- **People are resistant to change**
- **Managers need to intervene or no work will be done**


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Douglas MacGregor describes two theories of people at work from the perspective of management.

Theory X managers have a very negative view of the human condition, seeing their employees as basically lazy and good for nothing – people who need constant and close supervision in order to get a good day's work from them.

Principles of Human Behaviour - Leadership - 17.19




MacGregor's Theory Y

- People seek responsibility
- People need to work
- People want to do a good job
- Managers should enable

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Theory Y managers, however, have a more positive view of human nature, believing that people want to do a good job – the management task is to provide the environment in which this can be achieved.

Principles of Human Behaviour - Leadership - 17.20



McClelland's Thought Patterns

$$\begin{array}{ccc} \text{Achievement} & & \\ + & & \\ \text{Affiliation} & = & \text{Primary} \\ + & & \text{Social} \\ \text{Power} & & \text{Motivation} \end{array}$$

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David McClelland – a student of Maslow – set out to validate Maslow's theory, but results were so disappointing that he devised a series of empirical tests which resulted in the production of a new theory altogether.

After studying a large number of people from more than nineteen nationalities over a ten-year period, he identified that 80% of the time, people are driven by one of three types of concern which affect observable social behaviour. During the remainder, they are concerned with primary needs which do not affect social behaviour. He concluded that people are motivated by what they most often think about (i.e. constantly think about food, motivated to eat more and more)


The three *thought patterns* he identified are the needs for:

- achievement;
- affiliation;
- power;

and these were labelled *Primary Social Motivation*.

Different jobs and responsibilities call for different kinds of motivation. It is therefore crucial for managers to know the motivation profiles of themselves and their team.

Principles of Human Behaviour - Leadership - 17.21



Motivation Profiles

Achievement	Affiliation
● Sales	● Teachers
● R&D	● Counsellors
● Research	● Co-ordinators
● Sports	

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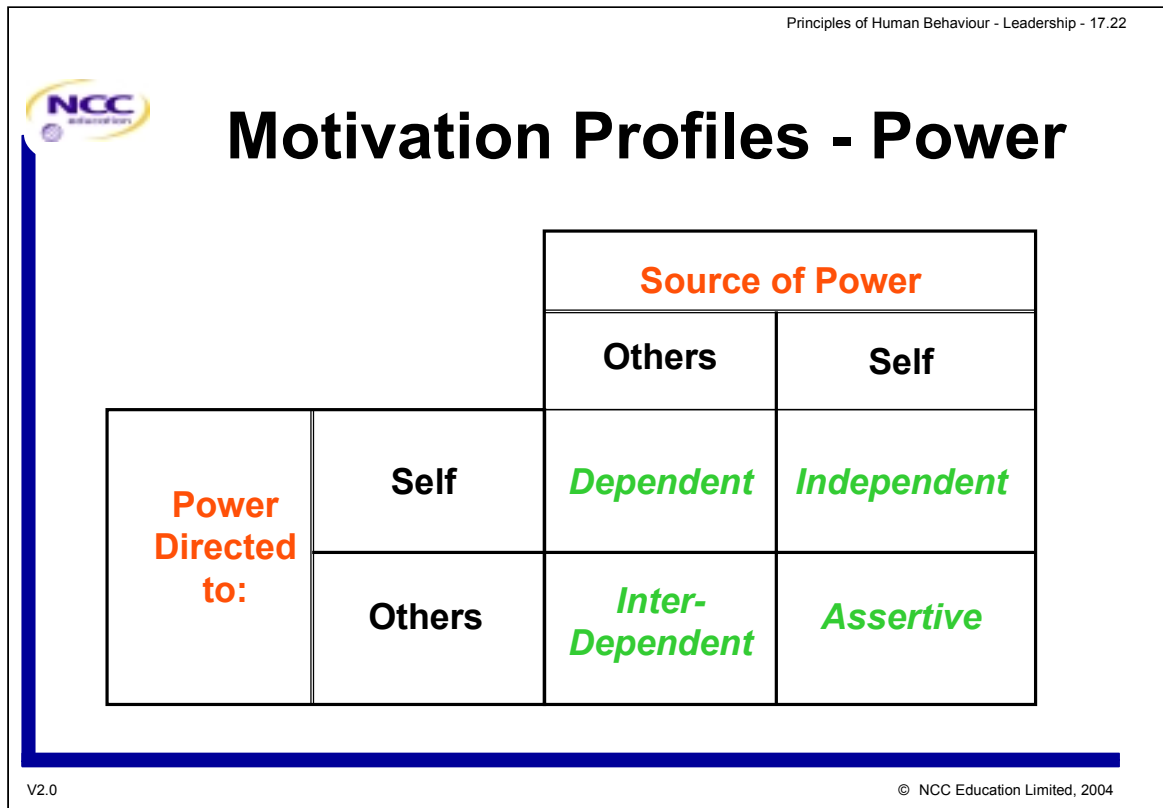
Characteristics of jobs requiring a high level of *achievement* motivation are:

- personal responsibility for goal achievement;
- direct performance-related feedback;
- feedback is measurable and task achievement can be quantified;
- responsibilities and tasks are challenging;
- the job requires continuous improvement and access to experts.

Jobs needing *affiliation* motivation show characteristics such as:

- interpersonal skills and empathy;
- collaboration and co-operation with many people;
- structures which rely on close relationships and mutual trust;
- non-competitive (win-win) situations;
- jobs where reporting on success and failure – and intermediate feedback – is given and received at group, rather than individual level.

Management of such individuals is therefore a task in which each of these characteristics needs to be emphasised.



A power motivation is more complex. There are four distinct types of power as shown in the visual. The stages of power are influenced by the source of power – from self or others – and its focus, again either to self or others.

Dependent people need to:

- assist in important endeavours;
- look up to and respect their superiors;
- have responsibilities which entail being of service and help to more powerful people, e.g. customers or clients.

The *independent* category need:

- to be allowed to perform their job with minimum control;
- responsibilities that require a high degree of discipline and organisation of tasks (not of people);
- tasks which require adherence to procedure.

Assertive people need:

- to manage and motivate others;
- to be responsible for inspiring a team;
- to take leadership;
- respect, prestige and status.

The *interdependent* category encompasses:

- roles where one is primarily a figurehead, removed from everyday activity;
- situations where the main job is to delegate;
- jobs where enabling others is a priority;
- roles where it is important to act as an exemplar rather than a direct leader.



Motivation Summary

- **Motives are situational**
- **Managers should help people engage with their motives**
- **Motivation should be aligned to the task in hand**

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Everyone has motives; the task of the manager is to enable the team to understand and engage with their own motives.

Motives are aroused by the situation; and different situations arouse different motives – when motives are aroused and aligned to the task in hand, people perform well.

Everyone has a need for achievement, affiliation and power, but at different levels in different situations. The more a manager can match the needs of a task to the motivations of the individual in the team, the greater the job satisfaction experienced and probably the better the job will be done.


Principles of Human Behaviour - Leadership - 17.24




Preferred Learning Styles




Activist



Pragmatist



Theorist



Reflector

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Individuals are not always hostile or reluctant to receive a message, or learn a new skill, but – if the sender of the message, or the lecturer/trainer consistently refuses to take care to make sure that the communication method and medium are appropriate – they will soon become so!

Different people exhibit a range of preferences in terms of the way they receive messages. Broadly speaking, there are four types of receiver preference, and each communication should be targeted to address these preferences. If necessary, this could mean that the message has to be communicated differently to different people.

As you will remember, this topic was introduced during the Human Communications introductory session. when you were provided with the Preferred Learning Styles Questionnaire.

The next four visuals provide lists of likes and dislikes that characterise the different styles.

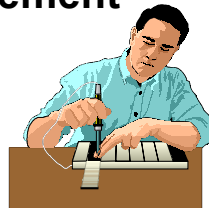
After completing the Learning Style self-assessment questionnaire provided, students should compare it with their original assessment from Lecture 2 of Module 1. Any resulting discrepancies or comments can then be discussed.



Pragmatist

Like

- Clear linkages
- Tackling real problems
- Opportunity to practice/implement immediately
- Repeatability



Dislike

- Talk/chalk
- Theoretical emphasis
- Apparent lack of progress
- Political/managerial or personnel obstacles to progress
- No clear guidelines



Theorist

Like

- Opportunity to analyse/generalise
- Opportunity to probe basic precepts
- Intellectual stretching
- Well argued/interesting concepts
- Complex issues



Dislike

- Emotion
- Open ended or irreconcilable problems
- Being out of tune with others
- No basic principle, policy or concept
- No like minded people



Reflectors

Like

- Stand back and observe
- Allowed to think before action
- Opportunity for further study
- Structure



Dislike

- Cut and dried argument
- Rushed activities
- Lack of data
- Forced to do a superficial job in the interests of expediency



Activists



Like

- New experiences
- Ideas without constraints
- In at the deep end challenges
- Excitement, drama, crisis
- High visibility

Dislike

- Listening
- Solitary work
- Repetitive activity
- Precise rigorous specification
- Attention to detail



Summary

- **Leadership**
- **Motivation and incentives**
- **Learning styles**

In this session we have examined the nature of leadership, introduced teams, and described the various leadership styles appropriate to team management.

We also discussed:

- the principles of motive and motivation, and described the most relevant theories of motivation in the work environment;
- the various learning styles.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 18 Principles of Human Behaviour - The Team and its Roles

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This session reviews team leadership styles as discussed in the previous session, and looks further at the teams, making a successful team, and the roles required in order that a team can be effective.



Winning Teams - 1

- **Common objectives**
 - clearly understood, collectively accepted, owned by the team members
 - need to be clarified and agreed by discussion and consensus
- **Roles**
 - for all members which recognise and develop their skills
 - to be effective, members need clear idea of their role

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Effective teams are never formed simply by putting people together. A good team must be led and created by paying attention to establishing common purpose and relationships within the team, in the light of the attitudes and skills of the team members and the procedures and culture of the organisation.

The characteristics observed in teams which have a reputation for consistent and effective performance are as follows.

- *Common objectives* which are clearly understood, collectively accepted and, as far as possible, owned by the team members. No team or group of people can be effective unless they know what they are trying to achieve. Objectives need to be clarified and agreed by discussion and consensus. The more consultation that takes place in setting objectives and relating these to the teams perception of the situation, the greater the commitment by team members to making them happen, simply because they will have been involved and thus feel ownership over those objectives.
- *Roles* for all members which recognise and develop the skills they can offer the team. Most teams have a leader whose main role is to co-ordinate the efforts of team members in meeting their objectives. Appropriate leadership style will vary according to the stage of development of the team, the requirements of the task in hand, and the leader's own personal abilities. Roles and responsibilities of the other team members will similarly vary; however, in order to be effective, *each and every* member needs to have a clear idea of their role and be committed to it.



Winning Teams - 2

- **Processes**
 - required which enable actions to be carried out quickly and efficiently
- **Open communication**
 - demonstrates mutual trust, co-operation, support and challenge

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- *Processes* for the way the team works which facilitate good decision-making. In the same way that objectives need to be clear, it is important to have pragmatic and effective processes for teamwork and decision-making. Good teams collect information quickly and share it amongst themselves by putting it all *on the table*. Problems are discussed openly, people listen to other's ideas, then make joint decisions to which all team member's are committed. Similarly, agreed procedures are required which enable actions to be carried out quickly and efficiently.
- *Open communication* structures which demonstrate mutual trust, co-operation, support and challenge. In an effective team the members can state their views, ideas and differences of opinion openly without risk of being ridiculed. This kind of atmosphere with *no stabbing in the back* leads to support and trust amongst members. In turn this generates co-operation from others. Members have no fear of sharing their problems and asking for help.



Winning Teams - 3

- **Networks**
 - **which build sound relationships with other groups**
- **Evaluation**
 - **regularly review the team's performance and ways of working**

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- *Networks* which build sound relationships with other groups. However efficient a team is it will have a limited degree of success unless it can link up with other teams:
 - What do we need from them, and are we getting enough?
 - What do they need from us, and are they getting enough?!

In this way the work of one team will not be hindered by another team through lack of understanding of what the other is doing. This is directly comparable to people within a team achieving more by working together.

- *Evaluation* mechanisms which regularly review the team's performance and ways of working. Regular examination of performance enables the team to improve:
 - What can we learn from the past that will help us in the future?

This *process review* should look at the team's role in the organisation, how it makes decisions, how new members are being integrated, as well as how it is performing task-wise. Additionally, there are also effective ways of looking objectively at group processes, including using a trusted outside observer, one team member, or the whole team.



Team Development Stages

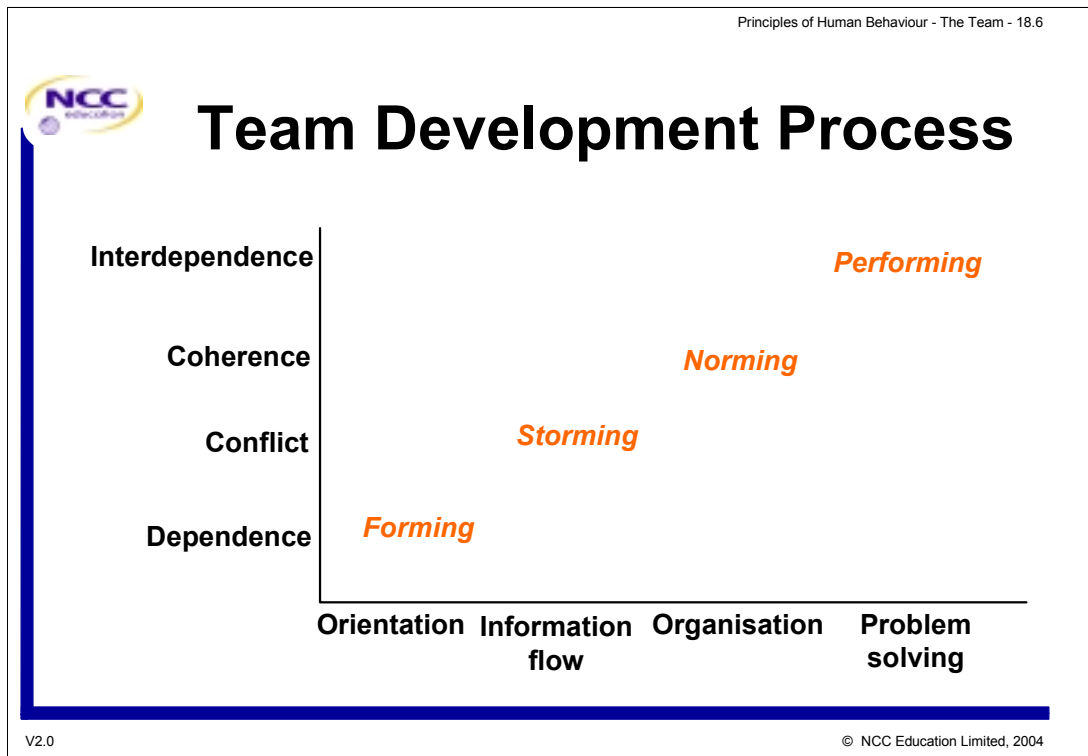
- **Forming**
- **Storming**
- **Norming**
- **Performing**

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The characteristics of the stages through which teams develop can be categorised as follows:

- *Forming*: Silence, anxiety, dependent on a leader, concerned to receive structured task requirements and methods.
- *Storming*: Noisy, searching and comparing ideas, emotional, resistant to demands of task, more self-oriented independent behaviours, possibly rebellious against initial leader, sub-grouping (if size above about eight). Information generation, opinion seeking and development of early pairings and relationships.
- *Norming*: Re-emergence of task demands and more open exchange of ideas and views. More *listening* and co-operation, with rules of conduct and identity of group (also in regard to their relationship with other groups) developing. Growth of 'we' feelings, group cohesion, individual roles and agreement on work and decision making processes.
- *Performing*: Settled interdependence and problem solving - energy now directed at task requirements.



The four stages are shown here graphically against the attributes displayed at each stage.

The extent to which any phase of this development process is experienced (and necessary) will itself depend on the level of interdependence required in the group.

It could be said that the higher the quality of the interdependence required, the more necessary it is for groups to spend time in the storming and norming phases, and indeed (as with any group in difficulty) to reiterate the norming and storming phases again if the deliverables from the performing stage are inadequate. At the extreme, the only solution may be reforming – splitting up of groups and their re-grouping.

It is during the middle stages of group growth that the individual's knowledge and understanding (and possible tolerance) of his colleagues' skills, role preferences *etc.*, and the willingness to confront and deal with conflict (usually inevitable and necessary in creativity) are developed. Without it, group performance will often be experienced as strangely sterile, superficial and lacking in real commitment and depth.



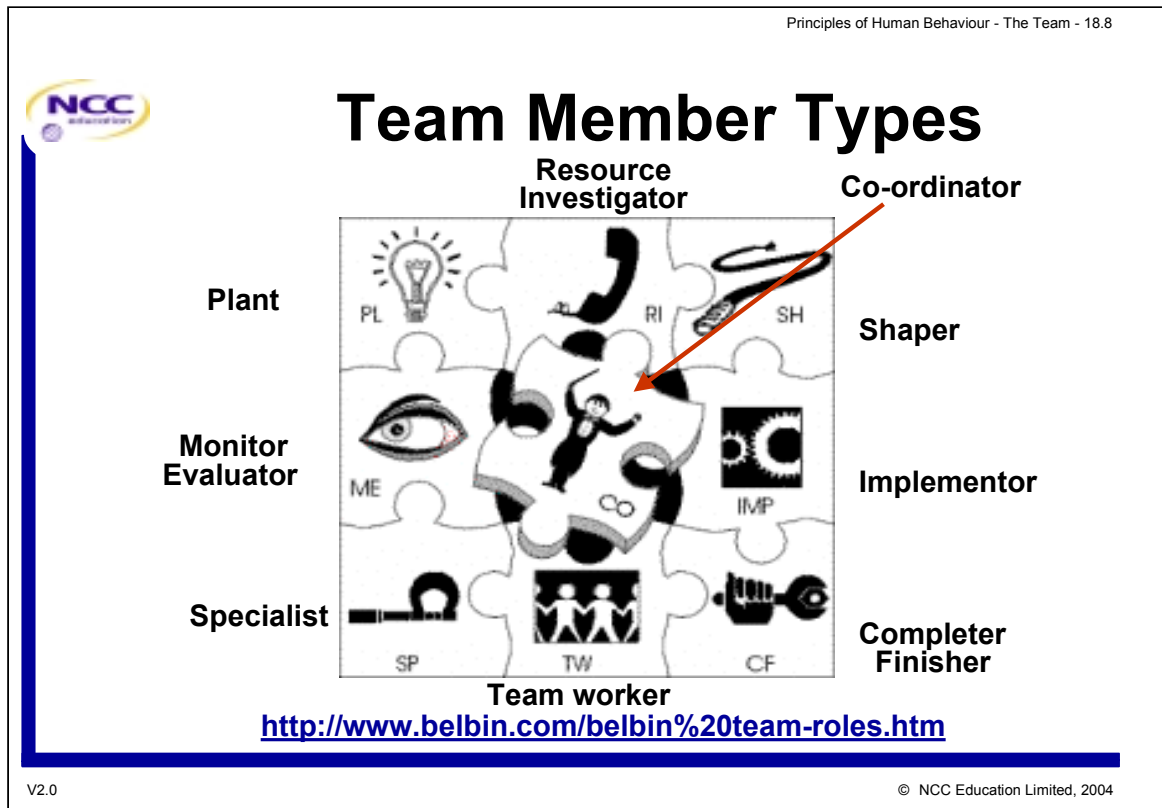
Balanced Team

Many facets

- Creative
- Careful
- Outgoing
- etc.

For a team to function at all, and to stand a chance of achieving the *performing* status, it is necessary for the team to consist of individuals with different characteristics.

Valuable research has gone into looking at the best mix of personalities in a project team. The behavioural psychologist, Meredith Belbin, studied teams working together on management games using various mixes of people. He initially tried putting all the people who were most able into one group. Surprisingly, these elite teams tended to do very badly – they argued a lot and as a result important tasks were often neglected.



Belbin came to the conclusion that teams needed a balance of different types of people.

- The *Chair* – not necessarily a brilliant leader but they must be good at running meetings, being calm, strong but tolerant
- The *Plant* - someone who is essentially very good at generating ideas and potential solutions to problems.
- The *Monitor-evaluator* – good at evaluating ideas and potential solutions and helping to select the best one.
- The *Shaper* – rather a worrier, who helps to direct the team's attention to the important issues.
- The *Team worker* – skilled at creating a good working environment, for example, by 'jollyng people along'.
- The *Resource-investigator* – adept at finding resources in terms of both physical resources and information.
- The *Completer-finisher* – good at completing tasks.
- The *Company worker* – a good team player who is willing to undertake less attractive tasks if they are needed for team success.

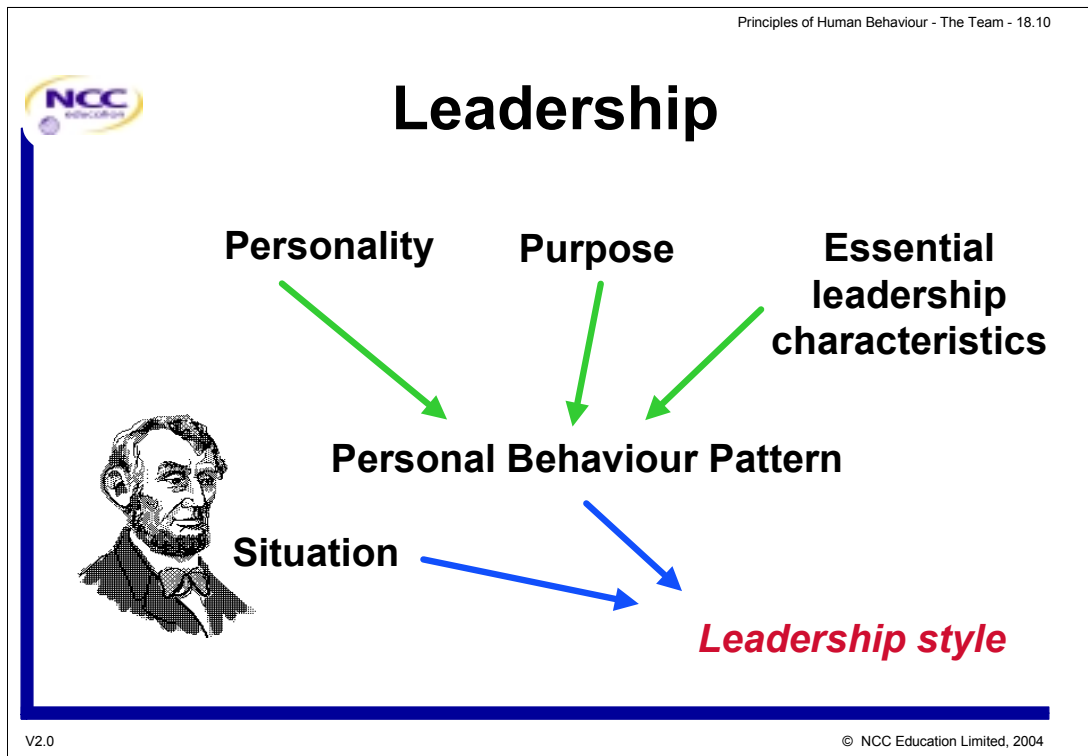


To be a Good Team Member...

- **Time your interventions**
- **Be flexible**
- **Be restrained**
- **Keep common goals**

A person can have elements of more than one type. On the other hand, about 30% of the people examined by Belbin could not be classified at all. To be a good team member, you must be able to:

- time your interventions, e.g., not overwhelm the others in the team;
- be flexible – be prepared to take on board others' viewpoints;
- be restrained – do not force your ideas on the team without consultation;
- keep common goals of the team in mind all the time.




In the Introduction to Human Behaviour session, we looked at the characteristics of the successful leader.

Consider the following questions:

- Should a leader be a generalist or a specialist?
- Should the leader have a high IQ?
- Should a leader tell team members what to do? Or just inspire them to do it?

Principles of Human Behaviour - The Team - 18.11



Types of Leader

Leader	Action
Mediocre	Tells
Good	Explains
Superior	Demonstrates
Great	Inspires

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The role of a good leader is essentially to keep an objective view of the whole project – its trends, problems and activities – from an informed viewpoint. It is important that the project manager does not become, for example, the engineering manager or the construction manager on the project on the project but stands back and ensures that engineering and construction are properly performed and managed.

The ultimate leaders develop followers who will surpass them. Runners will become coaches and train other athletes who will break their records. Executives will motivate subordinates so successfully that they will become their superiors. And parents, in their devotion to a child, will pull him or her up beside them – and then encourage the child to go even higher.

There are a variety of recurrent themes, all of which have come before us time and again as we have pursued the theme of the value of teams, and the role of the team leader. Words and phrases such as *learning*, *initiative*, *experience*, *being a good listener*, *teamwork* and *co-operation* recur constantly. These are all essential elements in a good team, led by an *effective* project manager.



The Action Centred Leader

Ensure allotted task(s) are completed

on time, to budget, to spec

Create, build and develop a team

Ensure clarity of task(s)

Ensure clarity of purpose of task(s)

Plan the task(s) with the team

Monitor progress

Appraise project upon completion

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Managers should be assessed for the quality of their leadership, but defining this in measurable and quantitative terms is not easy, so managers are judged by their effectiveness as leaders, which depends largely on:

- ensuring that allotted tasks are completed on time;
- creating and building a team that can deal with the task ahead;
- developing the team members by coaching, guidance and training;
- being quite clear about the task ahead, and making this clear to the team;
- understanding and explaining the way in which the task fits in with company objectives;
- planning with the team how the task is best accomplished;
- determining and then obtaining the necessary resources, indeed human resources;
- closely monitoring project progress;
- appraising the project following completion, in order to learn the lessons.

Principles of Human Behaviour - The Team - 18.13



Developing Team Skills



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Effective leadership is nothing more than plain common sense. However, many leaders are completely unable to motivate their team members through encouragement and inspiration by word and by example. Perhaps they do not try, never having appreciated the need. People are naturally self-motivating, but the opportunity has to be presented to them; self-motivation has to be encouraged.

The participation of team members must be real and put into practice through delegation and decentralisation. This is the responsibility of the leader, and the action centred leader will see that it happens.

The lecturer may like to initiate a discussion regarding:

- *the students' perception of their ability as team members and team leaders;*
- *what targets they should set themselves;*
- *the action plan they might put into place to improve on their current skills.*

Principles of Human Behaviour - Innovation, Quality and Productivity - 19.1



**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 19
Principles of Human
Behaviour - Innovation,
Quality and Productivity**

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This session expands on three topics, each of which has been touched on in other sessions. Here we focus on the human factors aspects of:

- innovation;
- quality;
- productivity;

and looks at the need for involvement and commitment by all members of the team to ensure continued business success.



When Opportunity Knocks...

- **Kodachrome was invented by two musicians**
- **Continuous steel casing was invented by a watchmaker**
- **Synthetic detergents were invented by dye-making chemists**

Innovations and inventions seem to come at random, without planning. At times, the idea seems to come knocking at the door most unexpectedly.

Behind these and other seemingly random inventions was an innovative team, not necessarily looking for the breakthrough they ultimately achieved. Talking of the relationship between basic research and actual breakthrough, Ralph Gomory, one-time director of research at IBM said:

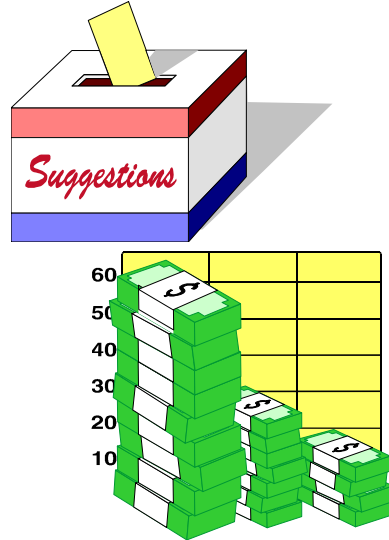
“A breakthrough occurs when the technological knowledge and a way to apply it to meet a need come together in one person’s head. Incremental steps forward are more pervasive than breakthroughs, but both are important. Science can be thought of as a large pool of knowledge fed by the steady flow from the tap of basic research. Every now and then the water is tipped out and put to use, but one never knows what part of the water will be needed. Yet history shows that keeping the water flowing into the pool is a very worthwhile enterprise.”

Despite the obvious random nature of research, it must be pointed out that in relation to investment in plant and equipment, investment in research is cheap. It is also crucial to continuing innovation, in that it provides the springboard from which so much innovation ultimately comes.



Rewarding Innovation

- All innovation should be rewarded
- Recognise team as well as individual
- Make positive requests for innovation
- Set an example and remove obstacles
- Expect and encourage 'failure'



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There is no doubt that those responsible for innovation should be rewarded appropriately. Rewards will produce positive results, although beware that it may not always be appropriate to reward financially.

All innovation should be rewarded, regardless of whether small or large, significant or insignificant. Whilst financial rewards for innovation are higher in the United States than elsewhere, Japan far exceeds any other country in the number of awards it makes. The premise is that a lot of small awards result in more attempts and suggestions from a wide cross-section.

Give full support not only to the innovator, but also to the team.

Make a positive request for innovation, via the ideas box and similar approaches.

The manager must set the example in this, as in everything else. People will do as their manager does, not as he says. The manager must also remove obstacles and hurdles that are placed in the way of the innovators.

Don't be afraid of failure - it is the foundation of success. Thomas Edison said after a few thousand failures in his quest for an electric filament bulb that would work: "I must be much nearer my goal now that I know a great many ways that do not work!"



Creativity and Innovation

- **State the problem**
- **Identify the symptoms - what information can we get?**
- **Gather and share the information - what information is needed?**
- **Generate ideas for possible solutions - which is the best?**
- **Combine ideas to build solution**
- **Develop an implementation plan**

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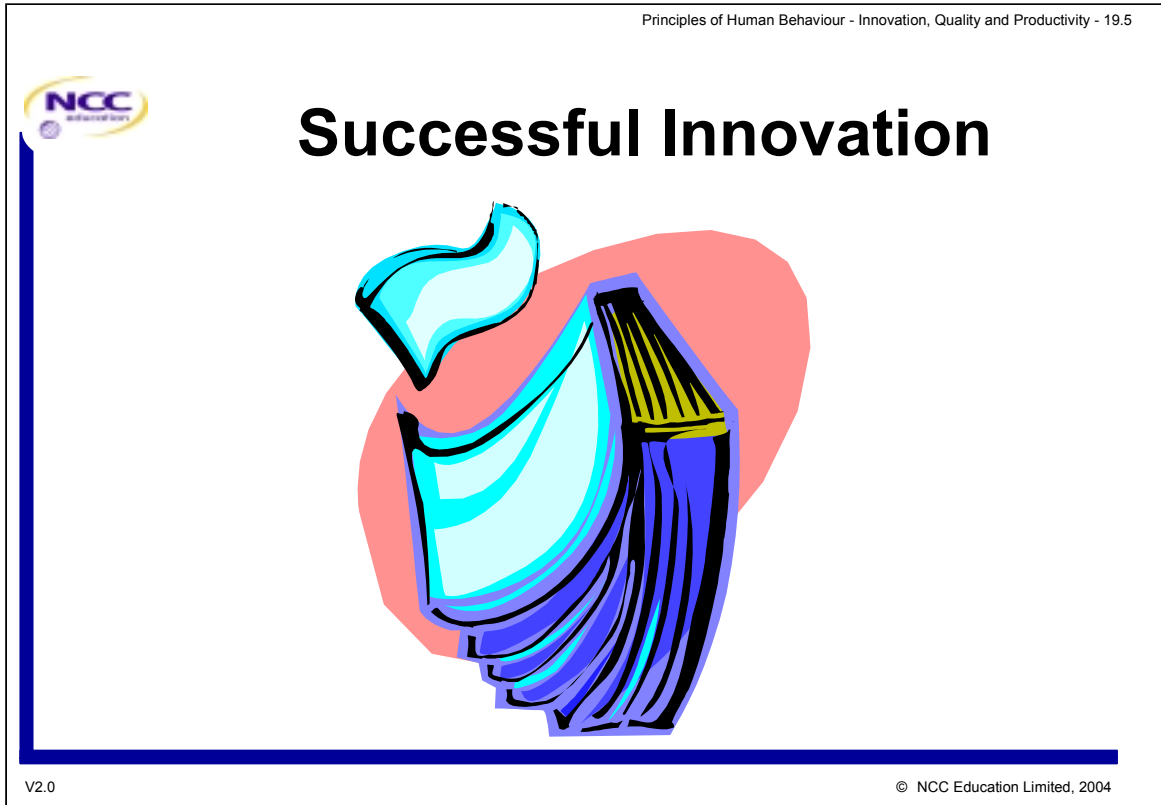
In order to innovate, one must be able to create. Creativity is associated with intuition, but there is often a problem in businesses of opening an intuitive channel that will support creative behaviour. Help can be obtained by applying the above constructive approach to problem solving.

It must be remembered that there is nothing to be ashamed of in taking another's idea and further developing and improving it – displaying creativity and innovation.

Professor Kaoru Kobayashi is quoted in the Japan Times in 1984 as saying:

“When we want to do something, we just try to learn and absorb all possible answers, alternatives and developments not only in Japan, but in Europe, in developing countries and in the United States. Then, by combining and by evaluating the best of all this, we try to come up with the optimum combinations which are available. We are very sophisticated copycats.”

One can benefit enormously from the ideas of others, learnt in the marketplace, building upon their hard work and so saving oneself considerable time by not *re-inventing the wheel*. Perhaps we should all try to become “sophisticated copycats”.




One of the best examples of successful innovation is provided by the *post-it* notepads now to be found in every stationery shop. This innovation has proved a phenomenal success, with a turnover of US\$200 million for 3M, the company which manufactures the relevant adhesive, but it had a very inauspicious start.

It is said that a certain Art Fry, a chorister, used bits of paper to mark the paces in his hymn book, but was perpetually exasperated because they continually fell out. What was required, he thought, was an adhesive-backed paper which would stick, but leave no trace when removed. In other words, what was wanted was a rather poor adhesive – surely that would not be too difficult. Nor was it; such a product was soon developed. Strangely enough the market surveys were all negative, and the idea was all but given up. But then the 3M executives and their secretaries got *hooked* and hailed it as a breakthrough.

Then the secretary to the chairman of 3M mailed samples of the new product to the secretaries of *Fortune*, the prestigious American magazine. They got hooked as well, and the product took off.

However, notice that the breakthrough was not achieved by the management, but by enthusiastic employees, and this not until some twelve years after the idea had been first tabled. Innovation is often not planned - it just happens, and sometimes in a very random, haphazard manner.

Principles of Human Behaviour - Innovation, Quality and Productivity - 19.6



Innovation

The myth	&	The reality
Innovation can be planned		It thrives on uncertainty
Market plan is a must		Move rapidly and experiment
Big team is essential		Small team is far more efficient
Strive for optimisation		Optimisation is a waste of time
Customer knows what he wants		Innovative product is usually ahead of the market
Technology brings success		Listening to the market is what brings success

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It seems that innovation is inherently a sloppy process. Accept that fact and live with it, and reap the rewards. That is the reality, whilst the myth that is commonly believed is just the opposite.

It can be seen from the set of comparisons, that innovation has its own characteristics, and that these will evolve as an innovative project develops. What is going to happen cannot be foreseen or planned.



Innovative Team

- **Multifunctional**
- **Undermanned and overworked**
- **Between 5 and 25 full time members**
- **Outward looking leader**
- **Very few simple rules**
- **Work for the fun of it**
- **Complete autonomy**

It can seem that innovative teams can be disruptive. They certainly need to be handled properly, and the best approach is often to leave them to their own devices once it has been determined that they have access to the necessary resources. The innovative team needs to be nurtured and encouraged rather than managed or controlled.

Listed on the visual are some of the major characteristics of the truly innovative team. They are not so dissimilar to the characteristics that have been outlined for any other team.



Innovative Team Leader

“The reasonable man adapts himself to the world: the unreasonable man persists in trying to adapt the world to himself. Therefore, all progress depends upon the unreasonable man”

George Bernard Shaw

It seems that the leader of an innovative team has to be an outstanding character in some way: it appears he is often classed as weird and even found to be unreasonable. George Bernard Shaw in *Man and Superman*, expressed characteristics of the unreasonable man: the man whom we expect to see in an innovative team.

Also, the innovative leader thrives on challenge, and as a result, projects are often taken on with a low probability of success – yet he often succeeds.

Innovative leaders have a difficult life, meeting opposition from many quarters. Many questions are asked:

- “Why divert precious resources to a doubtful project?”
- “Why work overtime?”
- “Why disrupt a production line for a series of speculative experiments?”

The innovative leader rarely gets whole-hearted support until he has completed his project and it is a demonstrable success.



Problem Solving

- **Listen attentively**
- **Encourage all members to contribute**
- **Give due recognition to ideas**
- **Recognise that differences in view are good**
- **Record progress and let the team know**



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Problem solving often plays a substantial role in innovative thinking. Any problem is created by a gap that exists between what is and what ought to be.

Unless solved, a problem can lead to frustration, anger and anxiety. This, naturally enough, results in lowered output and a fall in productivity. Also, a problem left unsolved has a tendency to multiply itself. A positive approach to problem solving is called for, and the team leader should always pay the most careful attention to such problems that are brought forward by the members of the team. Problems should never be ignored or set on one side as unimportant.

Also, other team members should not be ignored, and wherever possible the solving process should be a team activity. The leader should facilitate the process of problem solving, rather than trying always to solve the problems unilaterally.



The Need for Vision



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Task execution calls for very close attention to detail. The task leader is not directly concerned with the detail: that is the responsibility of others, yet he must be broadly aware of the detail. He must certainly be looking ahead towards the completion of the task immediately in hand, but should also be looking further than that.

He must have *vision*. He has to look ahead of what is going to come after, both for himself and for all the members of the team. They all must have a future.

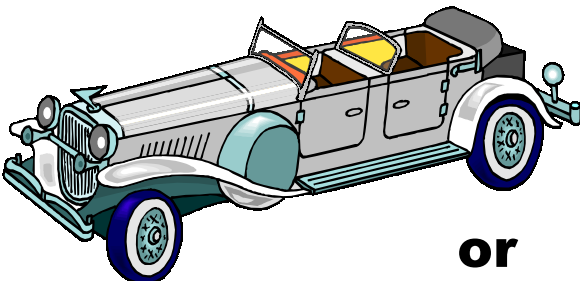
It is important to realise that no one knows what the future holds. Forecasting in business is often based on analysis of historical and current trends, then making projections and predictions, but even those who have devoted their entire careers to this can still get their predictions entirely wrong.

Even if you accept that the future is uncertain, it is still worthwhile to assess the prospects for the project leader and his team. Not only should the task leader and his team have some idea as to what will happen to them when the current task comes to an end, and they need to be able to look with some assurance to that immediate future, if their commitment to the current task is not to be adversely affected.


Principles of Human Behaviour - Innovation, Quality and Productivity - 19.11



The Significance of Quality



or



?

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The visual shows a classic Rolls Royce, and a modern Honda. Which would the students identify with the word *quality*?

The maintenance of high standards in relation to quality is seen to be essential to success. This has been found to be cost effective, and the supreme exponent of the art has been Japanese industry.

How do they do it? This achievement is made through a corporate wide commitment to producing quality products, and involvement, enthusiasm and pride in their work. The techniques employed are well documented in publications by the quality *gurus* such as *Ishikawa, Juran and Crosby*, and are all based on three fundamental principles:

- Quality is what the customer perceives. It is also a moving target and quality improvement must be a continuous and never-ending process.
- Quality is as important in the service industries as in the manufacturing industries. Just one error in an invoice has been found to create more ill-will than the need to return three or four items because of faults.
- There is no question of a trade-off between quality and cost. They are *a sum*, not *a difference*; they are partners not adversaries. Good quality implies a sound and economic use of resources. That quality is expensive, is a myth.



Paying for Quality

	Premium	Customers NOT willing to pay premium
Quality cars	33%	10%
Better quality dishwasher	50%	4%
Better TV set	65%	6%
Better quality sofa	75%	4%
High quality shoes	140%	3%

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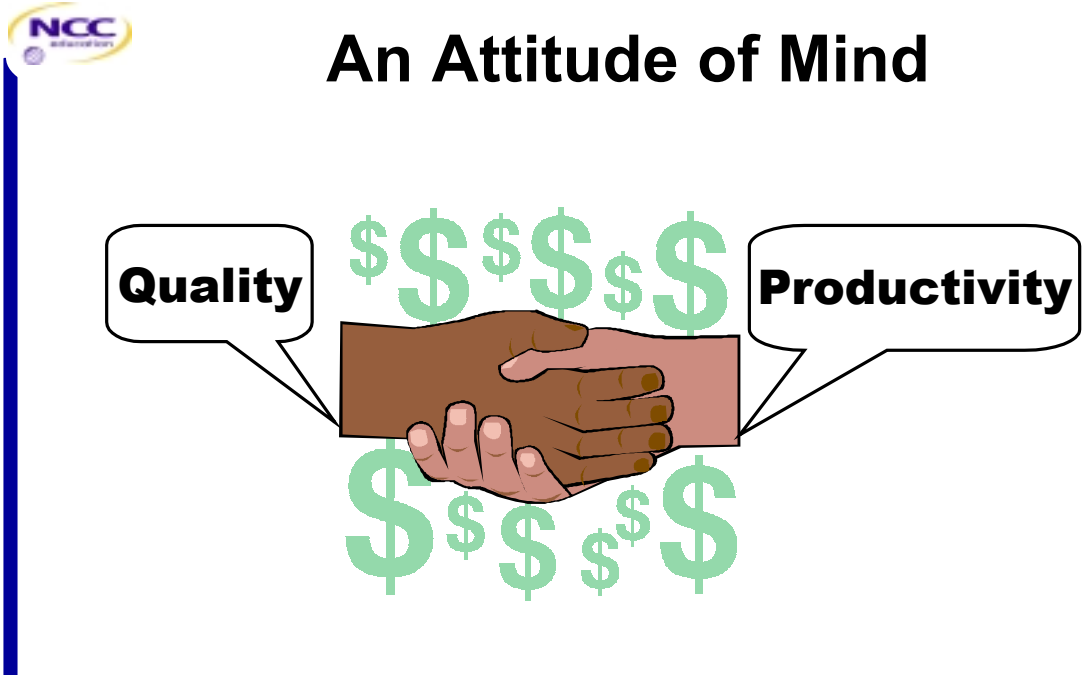
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Customers actually look for quality. An independent survey by the American Society for Quality Control confirmed that customers are willing to pay more, far more, for quality than is normally anticipated by the manufacturers or even the quality experts. The premium that would be paid actually varied greatly with product. The results are shown on the visual. The premium that customers were willing to pay is expressed as a percentage over the original price.

It seems that, generally speaking, ever fewer people were unwilling to pay a premium as the size of the premium people were prepared to pay increased.

The survey also disclosed that people in the higher income brackets were by far the most dissatisfied with the quality of American products. They were prepared and able to pay for the higher quality, but couldn't find it on the market.

Principles of Human Behaviour - Innovation, Quality and Productivity - 19.13



An Attitude of Mind

Quality **Productivity**

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Quality and *productivity* must go hand in hand. It is of no use producing a superb quality product unless it can also be produced in a reasonable time at a competitive price. This demands high productivity.

The relationship that should exist between quality and productivity is determined by one common factor – *people*. Although techniques have been discussed on how to achieve quality. Quality itself is not a technique. Quality is about care, people, passion, consistency and commitment.

Quality also comes from people working together in a team with a common purpose. It has to be an obsession – it must form a 100% objective whilst at work: even 99% is just not good enough!

Quality is an attitude of mind.

There is no doubt that if quality and productivity go hand in hand, the end result will be a profit. Both quality and productivity are difficult to measure in absolute terms – the only ultimate measure of their effectiveness is the fact that the company makes a good profit.



IBM's Quality Programme

- **Error free installations**
- **Innovation has no limit**
- **The quest for improvement**
- **Software coding defects**
- **Customer's and supplier's language**

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These are a few examples of how IBM achieved significant improvement in quality. The underlying theme throughout is people.

- *Error free installations:* Through proper focusing on this issue, putting a project team on the problem in relation to new products, IBM have achieved what was hitherto thought to be impossible – an error-free installation.
- *Innovation has no limit:* Even with mature products, such as flat ribbon cables, there was a lot of reworking. Inspired by an engineer, a team was set up specifically to attack this problem. The result – reworking fell from 25% to a mere 4% and problems on final testing from 12% to 1.2%, with payback within months.
- *The quest for improvement* was not restricted to their technical products – the most impressive results were obtained with their accountancy procedures and they reduced their 2% error rate on data entry to 0.4% over a two year period.
- *Software coding defects:* The number of defects for 1000 lines of code was reduced over a 6 year period by two-thirds.
- *Suppliers language:* When discussing quality with both customers and suppliers, IBM found that they needed to translate issues and measures of quality into the language of the partner to ensure that quality levels were both specified, achieved and maintained.



Research and Development

Four essentials:

- **Synchronisation of team and organisation**
- **Commitment of organisation to team**
- **No turn-over of project management**
- **Effective interfaces between team members and rest of organisation**

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Research and development is very difficult to assess in terms of quality and productivity. Their profitability can never be assessed – yet their efficiency can be measured.

Research undertaken by Massachusetts Institute of Technology (MIT), found that in order for a research and development team to be efficient, it is essential that four criteria are met.

- *Synchronisation of team and organisation* – ensure that the long term goals of the team are in line with those of the organisation.
- *Commitment of organisation to team* – to provide a secure working environment for the innovative team, as already discussed.
- *No turn-over of project management* – as the project leader is crucial to the success of the R&D or innovative project.
- *Effective interfaces between team members and rest of organisation* – to ensure that the team members retain contact with the reality of the current business and its drivers.

Many current research projects are undertaken collaboratively – some even on an international basis.



Use of Incentives



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Motives and incentives have already been discussed in a previous session – but it is worth revisiting it here.

Human nature is very complex, and it is difficult to determine exactly what it is that motivates individuals and ensures higher quality, better productivity and innovation.

Financial incentives are a considerable help – but unfortunately, financial incentives can often become counter-productive, as incentives for individuals are not the same as incentives for teams. Incentives such as a pro-rata bonus scheme, will certainly encourage people to take on more work, and the ambitious will stand out above the others, but this is not necessarily a good thing. Of more importance is the team and its concerted effort; incentives should never be so designed as to destroy the team concept – since that is crucial to success.

A company profit sharing scheme can be effective, but it is also important to note that there is an immediacy aspect required to the reward of outstanding work, and there is often a delay in the pay-out of such schemes.

When comparisons between the United States and Japan are made, the Japanese system works by making a significantly higher number of lower rewards than the American counterparts.



The primary principle that is employed by organisations who are committed to maintaining and improving quality is that of the Quality Circle. The quality circle is, in effect, a very special type of team, developed for this specific purpose.

Unlike the normal project team, which is usually involved in a wide range of subjects, the quality circle is involved with one subject only. It usually consists of 8 to 10 members, with appropriate skills, and is concerned with making specific recommendations for the improvement of an existing operation, service or product.

The team has to use all the available facts, even if they are inadequate and then seek more facts if that is felt to be necessary. The team is often involved in brainstorming, so brainstorming techniques can also help.

Disagreement can lead either to hard feelings or to innovation, depending largely on the sense of purpose which drives the team. The clash of ideas however, should be encouraged, but the clash of personalities discouraged!



The Need for Involvement

- **Ask open ended questions**
- **Use silence when appropriate**
- **Redirect questions to other team members**
- **Avoid win/lose situations**
- **Make eye contact**
- **Use humour when appropriate**
- **Be willing to listen**

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Imagine what would happen if a leader responds to a suggestion with “it is contrary to company policy” or “it just won’t work”. It is highly unlikely that the suggestion will be further worked on, and the morale and motivation of the individual making the suggestion will drop.

Everyone needs to be involved in innovation, and encouraged to provide good ideas that will be given due consideration.

This is the way of life in Japan.

Japan has created the proper climate for innovation by insisting that everyone, right down to the worker on the shop floor, is involved in innovation. Their ideas are requested and acted upon. Further, the office personnel, suppliers, salesmen and subcontractors are all treated as members of the larger team and asked to contribute their ideas. This co-operation has become all the more important with increasing computerisation and the interrelationship of all the operations.

The visual shows some constructive ways of encouraging involvement in a meeting situation.

Principles of Human Behaviour - Innovation, Quality and Productivity - 19.19



Performance Follows Commitment




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It is apparent that performance is wholly dependent upon employee attitude, and the key attitude is that of commitment. For an employee to be committed, they need to have a cause to which all can subscribe. If the causes are believable and believed, then the employees will maintain their commitment to the company, the team and its products. Management cannot order commitment, but it can get people involved by translating the overall company cause into specific actions relating to small groups, and then see it spread.

Phrases such as more *profit* or *continued growth* are meaningless to the average employee – such objectives need to be broken down and set before the team members in terms that are meaningful in the context of their day to day activities.

Principles of Human Behaviour - Innovation, Quality and Productivity - 19.20



You Get What You Expect!

Positive

- Expectations bring positive results

What a challenge, let's have a go!

Negative

- Expectations bring negative results

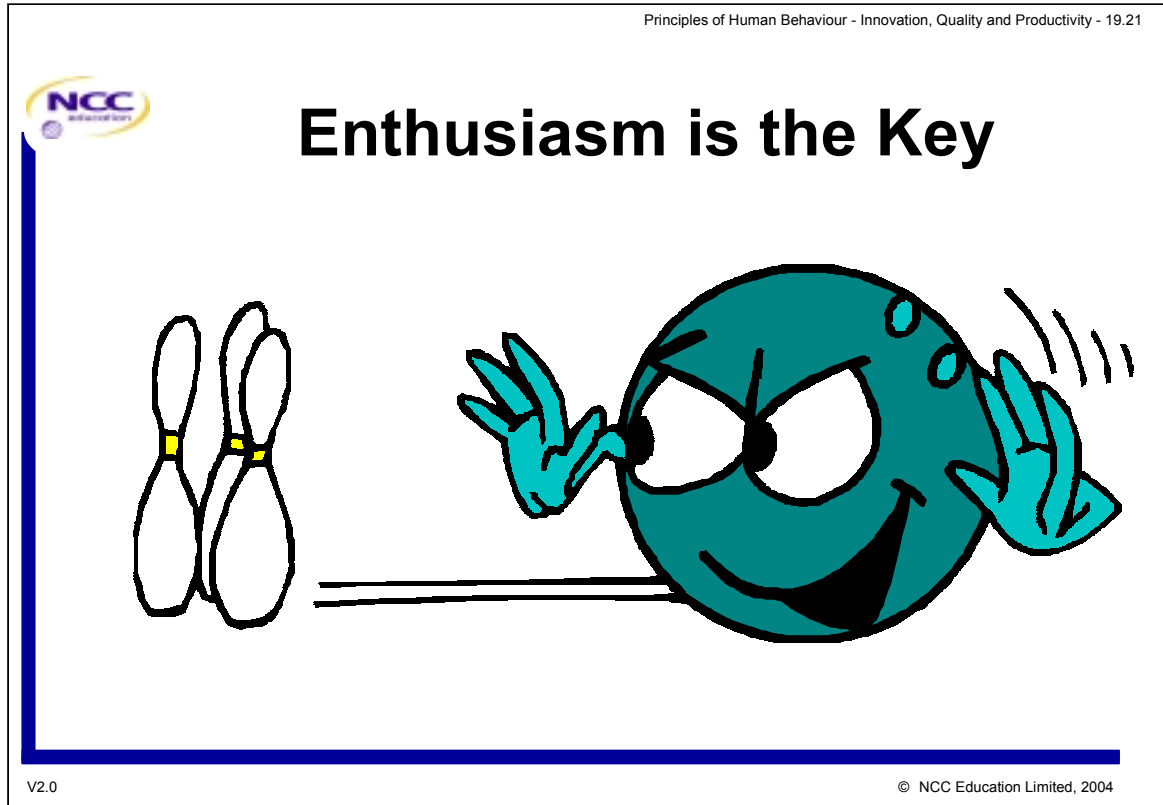
We have never done it before

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When we consider people's involvement and commitment to their work, there is a very simple adage which should never be forgotten. "A person performs as you expect the person to perform", or to put it the way it really happens, a person does what you expect of him, rarely *more than* you expect of him. It is a very simple truth and is often forgotten.

This is known as the *Pygmalion effect*, named after a certain king of Cyprus. Mythology tells us that the king sculpted a statue of a woman that embodied all his own desires and expectations. His repeated overtures to the gods finally resulted in life being breathed into his statue. George Bernard Shaw also took up this theme in his play *Pygmalion*, where a professor transforms a cockney flower girl into an aristocratic woman. It has further been asserted that student performance is far more in accord with the teacher's expectations than with their own natural ability. This also applies to managers and their employees – those managers who expect and look for the best from their employees will get it.

The significance of all this is that it demonstrates the belief that expectation plays a most significant role when you are dealing with people. Expectation, therefore must have a powerful influence on all the three aspects we are dealing with here, namely quality, productivity and innovation.



The link between expectation and a winning formula for performance is that employers with high expectations of their employees are able to find a cause about which the employees are able to enthuse.

There seems to be no limit to what can be achieved once the cause is there and has been successfully communicated to all the team. The most obvious example of this is the winning Formula One racing team.

There is no doubt that having a cause is a very powerful motivating factor, but to be meaningful it has to be translated into terms that all can understand. This is the challenge facing today's managers and leaders. For a cause to inspire people, so that they are committed, management needs to communicate that cause effectively. And we must not forget that a new cause is necessary when the present cause has served its purpose. We live in a fast-changing and dynamic world: people like change and something new. It becomes the task of managers to devise that for them.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 20 Resource Management - Managing Internal Resources

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The objectives of this session are to enable the students to understand how to recruit, manage and appraise individual staff members, and also how to deal with other colleagues, where there is no direct management line.



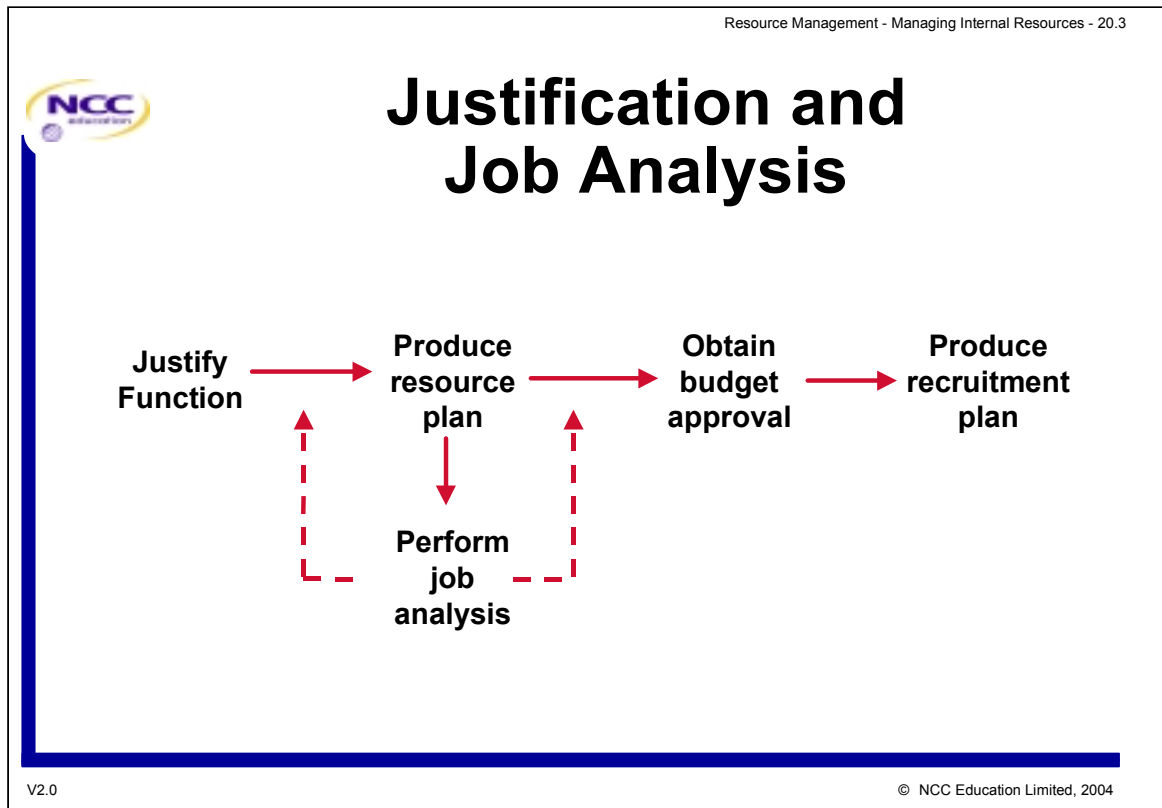
Topics Covered

- **Resource planning**
- **Retaining employees**
- **Selection procedures**
- **Interviewing**
- **Staff Appraisal**
- **Service Level Agreements and performance assessment**

We deal with the challenges of getting the right number of staff of the right calibre, and keeping them once they are employed. In particular to:

- identify resources required to carry out a given task;
- describe the most commonly used selection procedures;
- list the main pitfalls in interviewing;
- describe the goals of an appraisal system;
- identify the skills needed by a competent manager in these areas.

We also look at outsourcing to another department within the organisation, and the requirements of Service Level Agreements and measuring of performance.



For an organisation to survive, each function must be able to justify its existence. An effective way of doing this is to produce a *mission statement* as described in earlier sessions.

Once the functional role is understood, the production of the resource plan can begin. This will identify the positions and roles both of individuals and the overall department. The plan should be capable of response to challenges such as:

- What would be the effect if this job function was not done?
- Can it be devolved?
- What value does it add?
- Does it grow with the job holder?
- What changes have brought about this need?

It will be necessary to analyse each position individually. This will be an iterative process, with numbers and structures changing as the situation becomes clearer.



Job Analysis - Competencies

Job-specific		Management		Corporate	
Task	Time %	Task	Time %	Task	Time %

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A careful analysis of each position will identify the various competencies needed for each task; it can be helpful to tabulate these as shown on the visual.

- Job-specific competencies are those needed to perform a given job effectively.
- Management competencies are those needed to interact with the work force, especially those whom the job-holder will be responsible for.
- Corporate competencies are those which are specific to the nature of the organisation itself.



Candidate Requirements

Qualifications

Experience

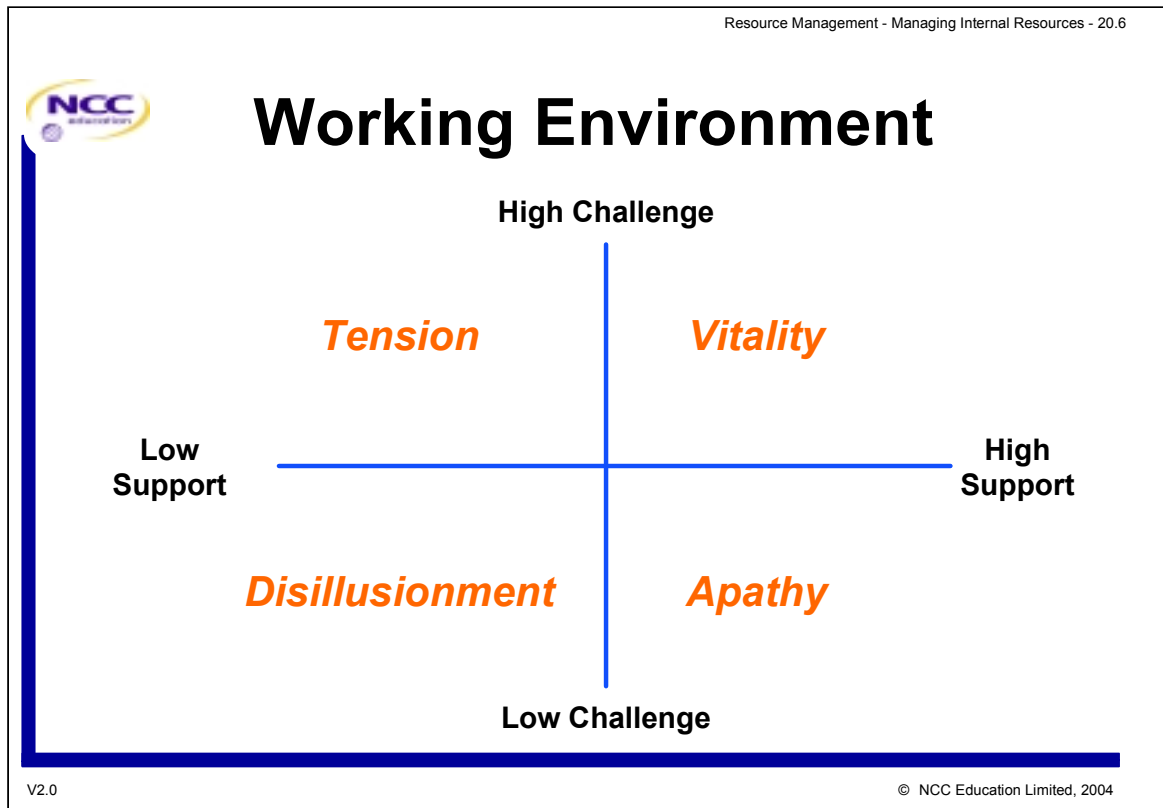
Personal Qualities

Profile



The means of identifying suitable candidates needs to be established as part of the resourcing plan. These should be defined in terms of:

- *Qualifications* – appropriate to the task. Academic qualifications are only appropriate to a certain type of task, and can often be a negative qualification.
- *Experience* – making sure that this is real experience from which the candidate has learned. As the question goes “does he have twenty years’ experience or one year’s experience repeated twenty times over?”.
- *Personal qualities* – behaviour patterns can vary widely between equally qualified candidates. Task-specific aspects such as pressure or repetitive routine need to be considered.
- *The job profile* – mobility needed, unsociable working hours, working alone for long periods, jobs in which performance is very much in the public eye will also have a significant effect on the right person.



The job profile can be determined by a close analysis of the working environment, using a model such as that shown.

The vertical scale represents the degree of challenge; the horizontal scale shows support available and received.

The response that would normally be expected is shown in each quadrant, and helps identify the sort of person who would fit into this type of environment.



Defining 'Right'

Unless you know how the best candidate would perform in the job, it will be impossible to recruit him or her

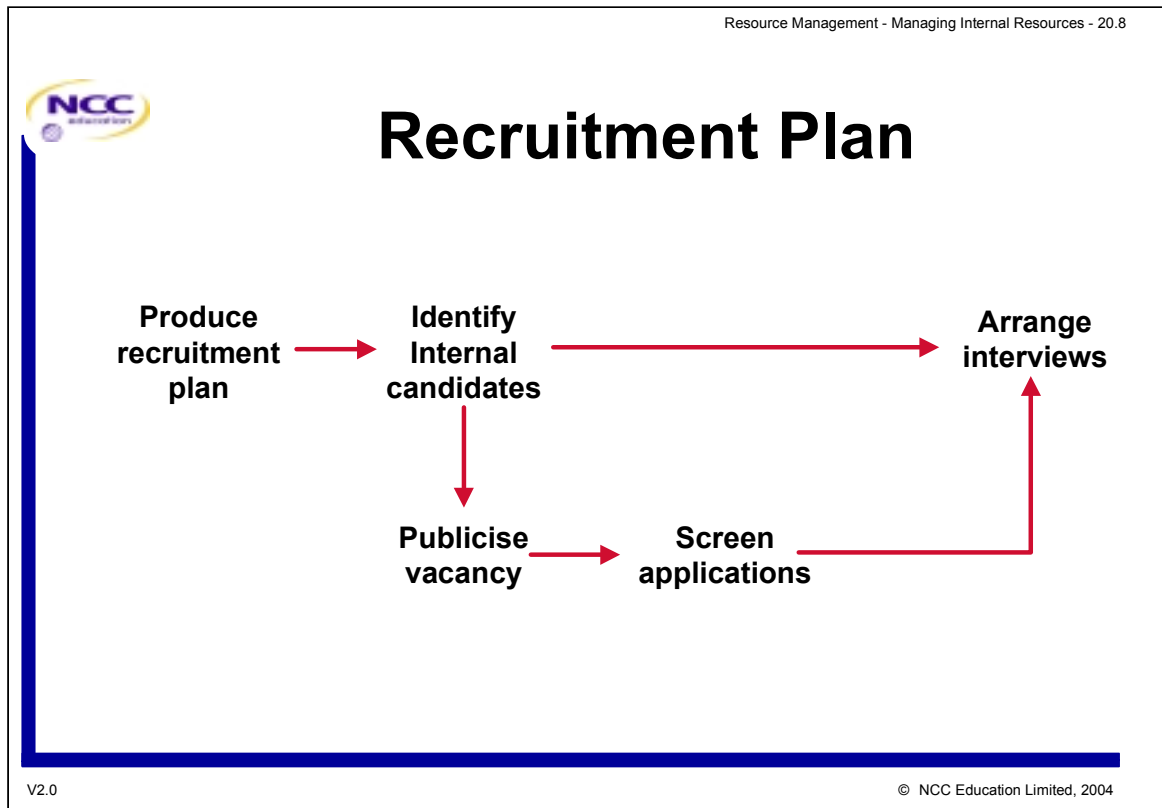


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The main value of this type of analysis is the identification of unsatisfiable aspects of the job which might prevent it being resourced at all, *and rectification of these*.

Unless the recruiter can define the best candidate for the job, he/she will be impossible to find. It follows that this aspect must be considered seriously before the rest of the resourcing process is initiated.



Recruitment can take a very long time indeed, and it is best to follow an established process.

There may be many sources of applicants – not necessarily all from outside the organisation.

Internal promotion can be the most cost-effective means of filling a new job – and there are an increasing number of specialist organisations who will perform a large part of the recruitment task, such as head-hunters and recruitment consultants.



Publicising the Vacancy

- **Rules/laws**
- **Attractiveness**
- **Job requirements**
- **Target audience**
- **Coverage**

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When considering the best way of publicising the vacancy, it will be necessary to consider many aspects:

- *Rules/laws* – there may be many of these governing what can and what cannot be said in a job advertisement, and what restrictions cannot be placed on recruitment because they would be seen to be discriminatory.


Attractiveness – the initial advertisement will give a strong impression of the organisation – if it is cheap-looking, badly worded or boring, it will not attract the best candidates.

- *Job requirements* – should be clearly stated in plain terms, encouraging those who are qualified and discouraging those who are not. For instance, if the job is for a translator from English to Chinese, an advert which used both those languages would act as a useful pre-selection mechanism.
- *Audience and effectiveness* – making sure that the advert will be read by its target audience. It would not be an effective strategy to advertise the job of football coach in a needlework magazine!

Resource Management - Managing Internal Resources - 20.10



Screening Applications



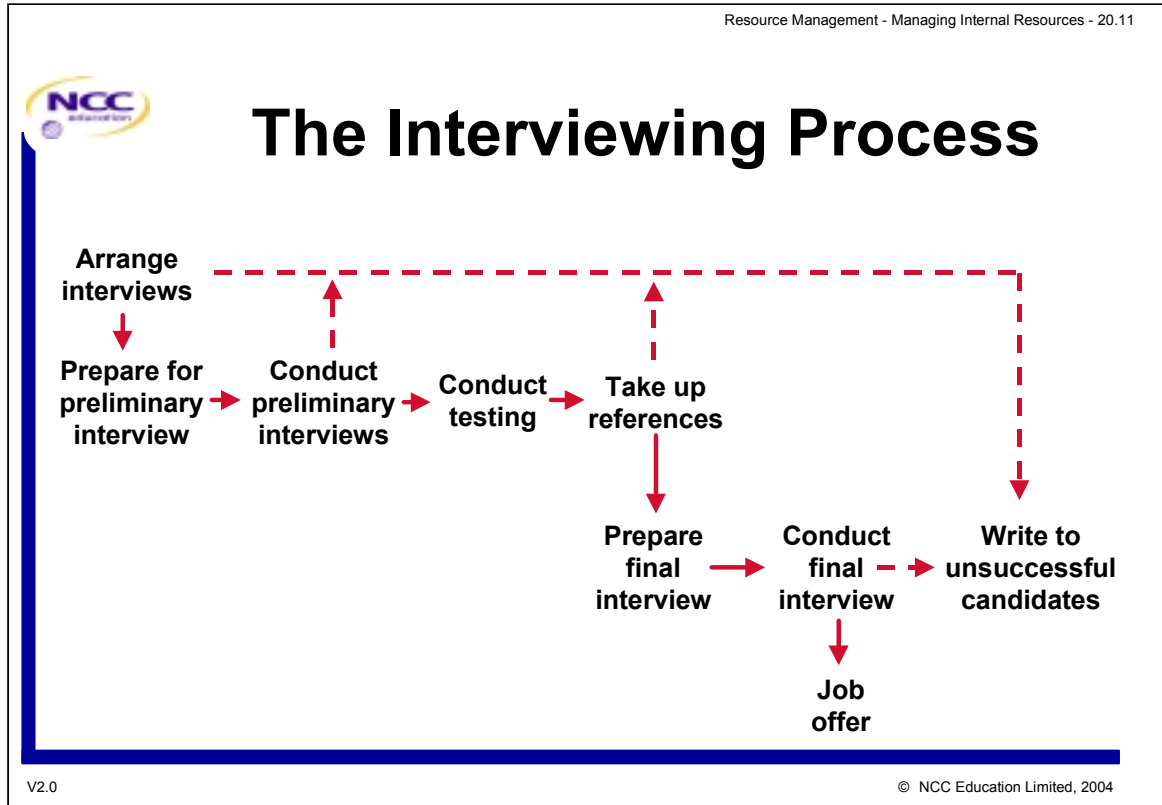
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The objective of the screening process is to select applications whose attributes are good enough to justify them being interviewed. This requires the decision criteria to be clear, in order that those who meet the criteria stand out from the crowd.

It is best to aim for a two-stage process in this, perhaps making a short list of three/four applicants with a reserve of another four, depending on the closeness of the match of attributes to requirements.

It is only basic politeness, and an absolute must-do to thank all applicants, to keep them informed, and to let them know of your decisions very quickly. One day, they may be interviewing you!



In a large organisation, there may be many people involved in the interview process, so arrangements should be made in good time.

Scoring systems may be used, but they should not be applied too rigidly; instead they provide a discipline within which the process can be flexible.

All interviewers should:

- be fully briefed about the job requirement;
- receive details of all the candidates;
- agree in advance what assessment criteria should be used;
- clarify any specific interviewing roles required.

It is essential that the criteria and method of assessing relevant attributes of interviewees is agreed in advance.



Interview Preparation

- **Who should be involved**
- **Timetable**
- **Scoring system**
- **Planning and checklists**
- **Purpose**

Preparation should not be rushed or performed without due care. In order to attract candidates who are right, and to make sure they agree to join the organisation, it is important that they should see an efficient and impressive view of the organisation, and the interview procedures will be an aspect of demonstrating this.

Preparation will help the interviewer to answer questions, and to sell the job. General company information should also be available.



Conducting Preliminary Interviews

- **Welcome**
- **Explain process**
- **Stress levels - two way**
- **Enthusiasm**
- **Specific job needs**



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In conducting interviews, it is important to:

- make the candidate feel welcome and explain the procedure;
- understand that both parties will feel stress in the interview situation;
- convey enthusiasm for the organisation and look for this in the interviewee;
- use specialists in order to check abilities if, for instance, the job has a high technical content or other specific need.

Integrity is important at all times. The best person to recruit will be one who is happy in the job – he/she will not perform well if enticed by unrealistic or unachievable promises.



Next Steps

- **Testing**
- **References**
- **Final Interviewing**

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A degree of testing – of behavioural characteristics and/or aptitudes -may be necessary to make up for deficiencies in the interviewing process, and it is usual to enlist the help of a professional specialist if this is required, since the interpretation of most of the worthwhile tests needs experience and specific knowledge.

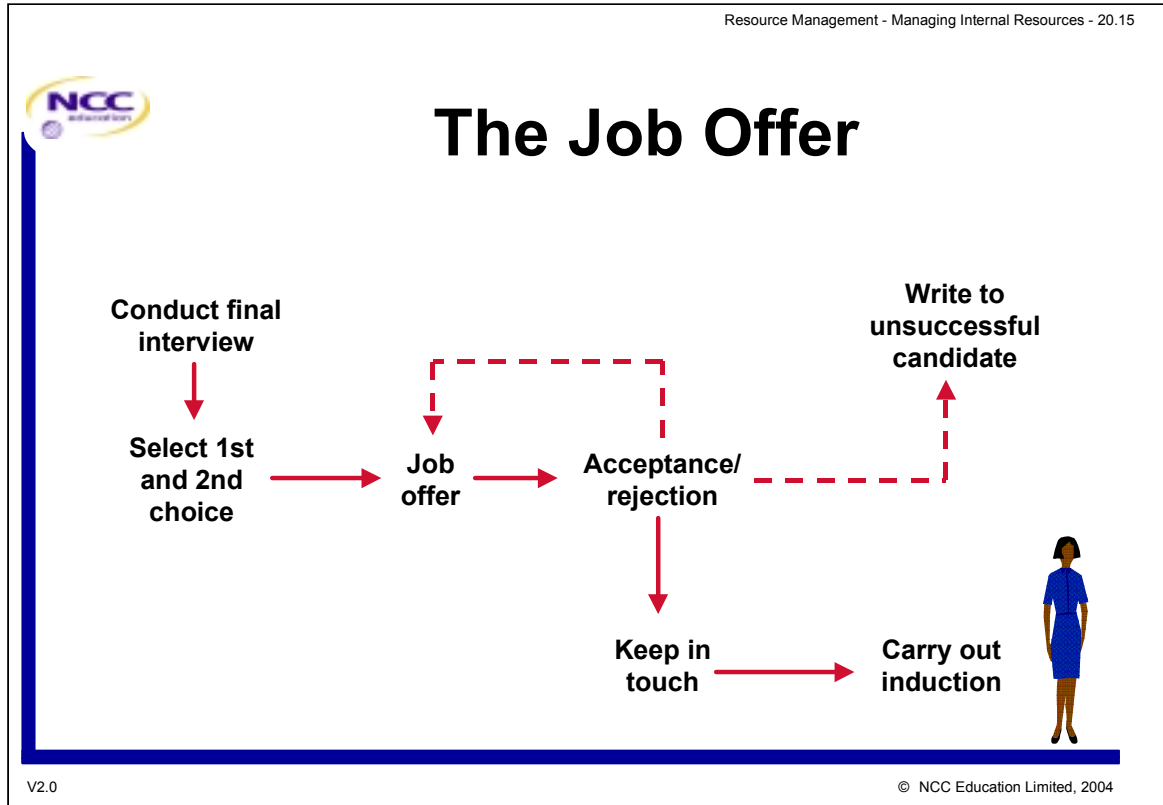
Referee names are only likely to be given by candidates of people who they think will make favourable statements. Nevertheless, they are worth contacting, if only to confirm the accuracy of some of the particulars submitted. The candidate's current employer should not be approached without the agreement of the candidate.

If academic qualifications are important, confirmation should be sought direct from the candidate's university; false certificates are not difficult to obtain, and false claims are often made.

Final interviews need even more careful planning than the preliminary interview. All the candidates who get to this stage will be acceptable; the purpose is to choose the best one. It is imperative that the candidate be interviewed by his/her prospective manager, since the wrong chemistry between them could rule out an otherwise acceptable candidate. It must be remembered that it is never acceptable to discriminate on the grounds of race, sex, or disability unless these relate directly to specific requirements of the job.

At this stage it is also necessary to finalise conditions of employment, timetable, and all other terms and conditions.

Normally, a first and second choice candidate is identified.



An offer of employment should be sent to the first choice candidate. All other candidates should be thanked for attending the interviews. It is a good idea to inform the second-choice candidate that the application is still being considered.

The offer should clearly state any conditions which apply, and stipulate a date by which it should be accepted.

It is wise to maintain contact while the candidate is working out the notice period with the existing employer.

It takes a great deal of money to find the right person. A good induction process makes sure that he/she gets off to a good start. The recruit must be made immediately welcome, with office accommodation and whatever other equipment is needed. Training and introductions should be arranged, and the new person should be given time by his/her manager in order to feel valued and become an accepted full member of the team.



Appraisal

- **Review performance**
- **Set goals**
- **Identify training and development needs**
- **Feedback- appraisal is a two way process**

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Once recruited, it is necessary to make sure that the person develops and maintains an effective contribution to the team. The appraisal process is the way in which this is achieved.

The appraisal system is a management tool, and has been defined as the means by which a job-holder and the job-holder's supervisor take time to talk freely and fully about the way in which the job-holder performs the required task, and to establish plans and priorities for the future.

Note that it is a two-way process, and is not merely about delivering a couple of reprimands and informing the person about next year's pay rise. It is *planned*, not a casual conversation; it looks ahead whilst not losing sight of previous performance; it does not restrict itself to details, but takes a broad view.

Good appraisal systems are a major opportunity to maintain an effective and committed workforce whose personal objectives are aligned to the organisation and supported by it.



Effective Appraisal

- **Supportive environment**
- **Open, honest and complete discussion**
- **Positive approach**
- **Mutual listening**



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Appraisals cannot be conducted in a vacuum. They should be supported by other organisational systems and conform to the organisation's culture, including the management of personnel records and training processes, to ensure that all recommendations are followed up.

The most important aspects needed for effective appraisal are openness of both parties to listen to the other's point of view, and a commitment from both to endeavour to improve, develop, or change if necessary.

It should also be noted that it is bad practice to wait until the appraisal if there are serious issues that need to be addressed by an individual, or indeed if praise is deserved. These issues should be dealt with as an ongoing management activity.

Openness needs to be made apparent – it cannot be simply assumed that the employee will trust the organisation implicitly. There should be no closed files or confidential material which is not accessible to the employee.



Timing of Appraisals

- **Fixed period**
- **Anniversaries**
- **Flexible/ad hoc**

The appraisal cycle should be regular, but the actual timing can vary.

- At a fixed time of year – focussing the whole organisation for a common period, and allowing training and action plans to be included in budgets, salary reviews and annual planning.
- To coincide with the job-holder's anniversary with the company – spreading the time needed for appraisals more evenly across the year, but possibly lessening its perceived value.
- On an ad-hoc basis, such as change of job responsibility, recognised performance problems, or other such issues.



Setting up the Appraisal

- **Job-holder's supervisor**
- **Indicate importance**
- **Clear and accurate objectives**

The appraisal should be set up by the job-holder's supervisor and should be treated in a way that reinforces their importance, with clear and accurate objectives being communicated to all parties.

Plenty of time should be allowed; and it is poor practice to allow appraisals to be moved around or be rescheduled because of other priorities.



Approach to Appraisal

- **Stress confidentiality**
- **Reinforce importance**
- **Focus on the future**
- **State process and objectives**

It is the responsibility of the supervisor to set the tone of the appraisal – taking care to make it positive and businesslike without being formal.



Appraisal Contents

- **Successes/failures**
- **External factors**
- **Results obtained**
- **Probe for real reason for poor performance**

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It may be that other managers should be given the opportunity to comment on performance, but the appraisal should normally be on a one-to-one basis.

Appraisal contents should include the following.

- *Successes/failures* – a brief review of the previous period since the last appraisal, paying equal emphasis to successes as well as failures, and the reasons for these.
- *External factors* – what things outside the job-holder's control had an effect.
- *Results obtained* – against previously agreed objectives, and against the action agreed at the last appraisal.

Probe for the real reasons for poor performance – what needs to be/can be corrected in order to eliminate the cause – is there a need for more training, better advice or closer management?



The Appraisal Interview

- **Allow comment/discussion**
- **Listen**
- **Encourage openness**
- **Remember the effect of culture**
- **Be flexible - admit error**
- **Check understanding - summarise**

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In the interview itself, the job holder should be encouraged to comment freely and say what he/she really feels in an open manner, with the interviewer not being defensive and being ready to admit error.

Additionally, the effects of culture should be noted – some people find it very difficult to operate in an open manner, feeling this to be impolite, and the interviewer should be aware of this.

A good line of questioning might be:

- “If you were asked to do this again, how would you approach the task in order to improve on last time’s performance?”

The interviewer should pay attention to actions which can be seen to lead to direct and measurable improvement, in which both parties can see positive outcomes.

At the end of the appraisal, the interviewer should summarise and check understanding, noting the actions agreed and the priorities for these.



Concluding the Appraisal

- **Summarise performance**
- **State actions agreed**
- **Identify priorities**
- **State how action will be monitored**

It is also important to state how the agreed actions will be monitored. There is nothing more frustrating for the job-holder to see nothing actually happening as a result of the appraisal, and this will very quickly negate the effectiveness of the process.



Appraisal Problems

- **Organisational**
- **The system**
- **The interview**
- **Attitudes**
- **Behaviour**

There are many problems which might prevent an effective appraisal:

- *Organisational* – poor follow-up administration, no commitment from senior staff, no training in appraisal technique, poor change management.
- *The appraisal system* – either too rigid or too informal, inconsistency in approach, use as a disciplinary procedure or simply as a means of deciding pay rises.
- *The interview* – insufficient preparation, many interruptions, insufficient time, hidden agendas on both sides.
- *Attitudes* – the parties having foregone conclusions, based on bias or prejudice, judgmental attitudes.
- *Behaviour* – avoidance of issues, aggressive behaviour, insincerity, or even dishonesty.



Appraisal Summary

- **Seek to**
 - review performance
 - set goals
 - identify needs
- **Skills required**
 - listening
 - empathy

In summary, the aims of appraisal are to:

- review the past;
- set goals for the future;
- identify the actions needed to enable improvement.

The essential skills are the ability of the supervisor to truly hear what is being said, and to be able to look at the issue not only from the management point of view, but also that of the job-holder.

Resource Management - Managing Internal Resources - 20.26



Service Level Agreements (SLA)



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Service Level Agreements (SLAs) are intended to define what a customer or user of a service can expect from a supplier or provider of the service. They can be used where two separate organisations need to deal with one another, or where different departments in the same organisation are involved. They are often drawn up when a manager has insufficient or inappropriate direct reporting staff or skills himself, and requires to utilise resources from another department.

The agreements should also define what the user's or customer's responsibilities are.

It is not uncommon to find SLAs written by an Information System Services provider and not agreed or understood by the user. They should be drawn up to ensure a common understanding of the service required by customers and are not intended to be contracts. They should also be *living* documents which are amended regularly to reflect changes in the business needs

In effect the process is simple – customer and provider agree suitable targets for service provision within existing resources. These are then measured and any discrepancies are discussed and explained openly. If there are regular problems with the delivery of the service against targets then information is available to request and justify additional resources.



SLA Contents

- **Purpose**
- **Systems and services supported**
- **Services not included**
- **Responsibilities (of both parties)**
- **Service level targets and measures**
- **SLA amendment guidelines**

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There are no standard templates for Service Level Agreements, as the contents are dependent on the actual situation concerned. However, there are a few basic principles that need to be considered.

- What is the purpose of the SLA? Why is it necessary?
- What is covered by the agreement, both systems and services – and to some degree, what is not covered. This will assist with clarifying any possible ambiguity, should a dispute arise.

It could be based on a tiered set of services, where some are provided free of charge, and some are charged for.

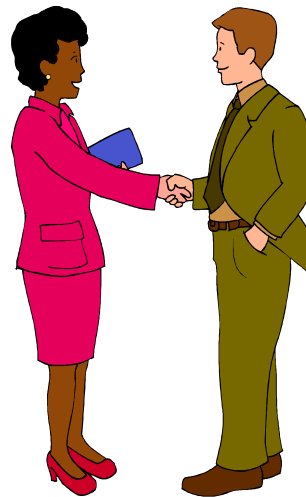
- What are the responsibilities of both the user of the service and the provider of the service – and who arbitrates?
- What are the targets for service levels – in terms of time, cost and quality – these should be stated in measurable terms, and the mechanism for measurement should also be included.

As this is a living document, details of the process required to amend the agreement should also be known and documented.



More than Just a Piece of Paper

- **Common understanding**
- **Improved focus of needs**
- **Performance against agreed measures**
- **Improved working relationships**



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A Service Level Agreement is more than just a piece of paper.

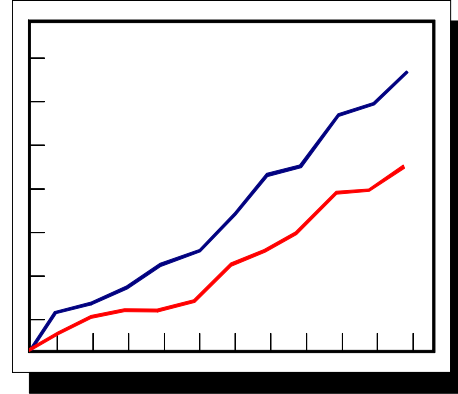
It provides:

- a common understanding of business and service requirements;
- improved focus on business needs within an Information System function;
- management information available on performance against agreed measures;
- enhanced co-operation between customers and service providers;
- budgetary input for increased resources;
- improved working relationships.



Performance Assessment

- **Measure continuously**
- **Publish results**
- **Compare against targets**
- **Agree corrective action if required**
- **Review and amend SLA**



Once a Service Level Agreement has been agreed and signed up to by both (all) parties concerned, it is necessary to set procedures in place for monitoring the performance against the agreed terms.

The measures that have been agreed should be meaningful, and easy to collate and assess. Good performance results should be publicised in both departments immediately to enable a positive effect on morale and incentives to take place. If the results are not as good as expected, then discussions need to take place without delay to agree corrective action. It may be that the Service Level Agreement is not viable and, until additional resources can be found, a lower level of expectation is necessary.

In all cases, regular formal review of the SLA is necessary to determine any required amendments due to changes in the business environment.



Summary

- **Resourcing, recruitment and appraisal of team members**
- **Service Level Agreements and performance assessment**
- **(plus Human Communications)**
 - **Leadership and teams**
 - **Human behaviour and motivation**


This session has covered a wide variety of topics concerned with utilising internal resources for undertaking specific tasks.

We have covered issues associated with direct management – those of recruiting and appraisal of team members and also those associated with indirect management, where the use of Service Level Agreements is necessary.

It should also be noted that material from several other sessions covered in this module is appropriate to the topic of managing internal resources – specifically:

- Human communications:
 - leadership and teams;
 - human behaviour and motivation.

Mentoring and Coaching - An Introduction - 21.1


**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 21
Mentoring and Coaching -
An Introduction**

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This session introduces the topic of mentoring, its history and some key concepts that need to be grasped by the students.

During the session there are five exercises for students to undertake. There are no right or wrong answers for any of these exercises. The importance of them is to begin a process of self-awareness in students as to how they may have experienced and benefited from mentoring (possibly sub-consciously) in the past.



Mentor - A Definition

- **A friend of Odysseus entrusted with the education of Telemachus**
- **A trusted counsellor or guide**
- **Tutor or coach**

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The story of Mentor comes from Homer's Odyssey. When Odysseus, King of Ithaca, went to fight in the Trojan War, he entrusted the care of his household to Mentor, who served as teacher and overseer of Odysseus's son Telemachus.

After the war, Odysseus was condemned to wander vainly for 10 years in his attempt to return home. In time, Telemachus, now grown, went in search of his father. Telemachus was accompanied on his quest by Athena, Goddess of War and patroness of the arts and industry, who assumed the form of Mentor.

Eventually, father and son were reunited and together they cast down would-be usurpers of Odysseus's throne and of Telemachus's birthright. In time the word Mentor became synonymous with trusted adviser, friend, teacher and wise person.

History and legend record the deeds of princes and kings, but each of us has a birthright to be all that we can be. Mentors are those special people in our lives who, through their deeds and work, help us to move towards fulfilling that potential.

A new form of mentoring is evolving that better suits the lean, high-tech, globally competitive firms that are emerging in our society.

The concept of mentoring is no longer tailored to the vertical hierarchical organisation. That old environment was paternalistic and nurtured the status quo.



Mentors In History

- **Telemachus - Mentor**
- **Joshua - Moses**
- **Plato - Socrates**
- **Beethoven - Haydn**
- **Jung - Freud**
- **Lennon/McCartney - Martin**

History offers many examples of helpful mentoring relationships - such as Socrates and Plato, Haydn and Beethoven, Freud and Jung.



Mentoring

Two people work together to discover and develop the mentoree's latent abilities

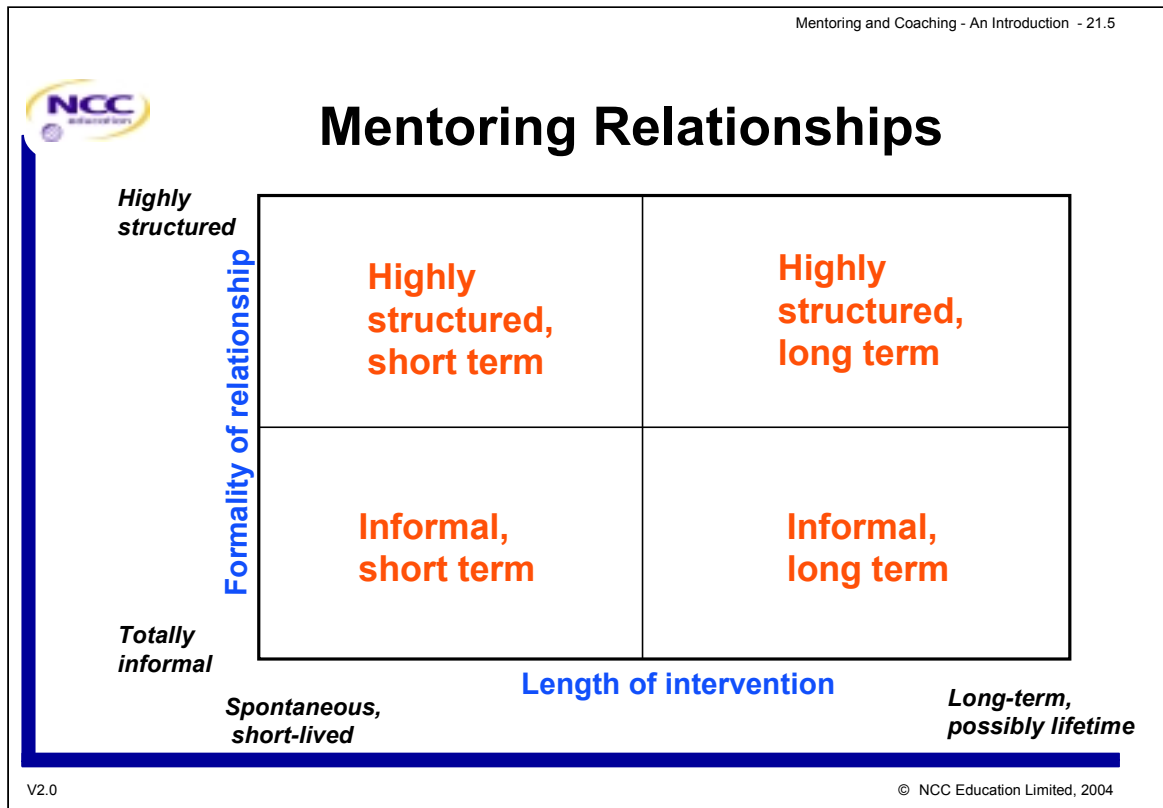
- **Empowerment of the mentoree**
- **Developing the mentoree**
- **Helping the mentoree reach their goals**
- **Counselling, teaching**
- **A work-oriented arranged marriage**
- **A shared adventure**

Mentoring is:

- a process whereby two people work together to discover and develop the mentoree's latent abilities;
- empowerment of the mentoree by developing his or her abilities;
- developing the mentoree for the responsibilities they will assume during their lifetime (work/career);
- influential people helping the mentoree reach their goals;
- counselling, teaching, work relationships, etc.;
- a work-oriented arranged marriage;
- a shared adventure.

Have you ever been mentored?

Do Exercise 1 – You as a mentoree.



Mentoring can be done by anyone, at any time and in almost any place. Mentoring can be a one-off intervention or a lifelong relationship. It can be carried out informally, as part of a friendship, or formally, as part of a highly structured new employee training programme. Many people who have been mentored recognise that something special has happened, but they may not even have known what to call the experience.

- *Highly structured, short term* – the relationship is formally established for an introductory or short period, often to meet specific organisational objectives.
- *Highly structured, long term* – often used for succession planning, this relationship involves grooming someone to take over a departing person's job or function or to master a craft.
- *Informal, short term* – this type of spontaneous mentoring ranges from one-shot help to occasional or as-needed counselling. There may be no ongoing relationship
- *Informal, long term* – friendship mentoring – consists of being available as needed.



Mentoring Benefits

- Increased productivity
- Better assessments
- Management/technical skills improved
- Latent talent discovered
- Leadership qualities refined
- Performance improvement
- Prevents 'rust'
- Better staff retention

*People **need** to be mentors*

A set of potential benefits of the appropriate use of mentoring is shown on the visual.

Many of these are qualitative benefits, difficult to quantify – but they all have the potential to lead to the improved staff morale and lower staff turnover – which lead to a more effective organisation through better teamwork and increased productivity.



Mentoring Downsides

- **Favouritism**
- **Career climbing**
- **Internal politics**
- **Role misunderstanding**
- **Jealousy**
- **Perceived threat (Queen Bee effect)**
- **Elitism**

Beware, however, of the dangers and pitfalls, if mentoring is inappropriately applied.

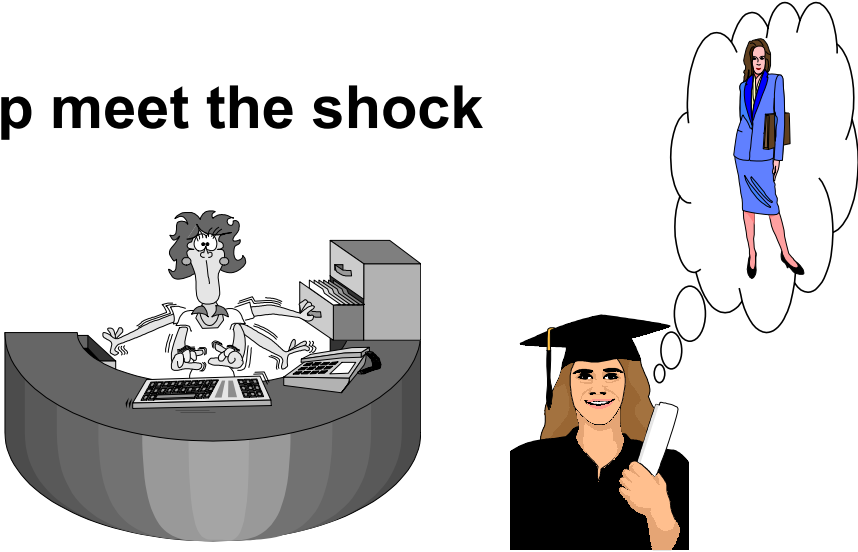
Mentors have been seen as senior people in an organisation who took talented young people under their wing and protected, taught and even sponsored these protégés. However, in recent years this sponsoring role has been criticised for leading to favouritism, career climbing and internal politics. In today's globally competitive organisations some people may dislike the word protégé because of the overtone of patronage.

Mentoring and Coaching - An Introduction - 21.8

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Mentors

Help meet the shock



The illustration shows a woman with curly hair sitting at a desk, looking overwhelmed with her hands raised. On the desk are a laptop, a calculator, and some papers. To the right, a graduate in a black cap and gown holds a diploma. Above the graduate is a thought bubble showing a woman in a blue business suit standing confidently.

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So what do mentors do?

At this point students should do:

Exercise 2 – Things Mentors Do.

Exercise 3 – Life Experiences.



Mentoring Critical Success Factors

- **Mutual choice**
- **Relationship extends beyond professional interest**
- **No threat**
- **Mutual need**
- **Affection**
- **Trust**

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Even formal mentoring is largely the art of making the most of a given situation. This flexible view tends to distress some individuals who expect, and perhaps need, a cookbook approach to any task – they want to know exactly what they are supposed to do, how to do it and when.

Mentoring is more than doing a good job – it is help that goes beyond obligatory relationships.

Teachers and lawyers can mentor.

- What is the difference between a good teacher and a great teacher?
- Or a good lawyer and a great lawyer?

Mentoring involves going above and beyond. It is a relationship in which a person with greater experience, expertise and wisdom counsels, teaches, guides and helps another person to develop both personally and professionally.

Do Exercise 4 – Life Helpers.



Mentor Monitoring

- **Shadowing**
- **Supervision**
- **Peer counselling**
- **Mentor groups**

As with any new responsibility, it is also important that the mentors are given the support and feedback necessary to enable them to fulfil their roles to the best of their ability.

This can be undertaken via a variety of mechanisms, at least one of which should be employed.



Mentors

- **Helpers, sharers, carers**
- **Experienced, critical, friends**
- **Coaches not cops**

Mentors are helpers. Their styles may range from that of a persistent encourager who helps us to build our self-confidence to that of a stern taskmaster who teaches us to appreciate excellence in performance. Whatever their style, they care about us and what we are trying to do.


Mentoring as a developmental art was going on long before the Greek classics gave it a name. In fact, it is probably one of the oldest forms of human development. Mentor's job was not merely to raise Telemachus, but to develop him for the responsibilities he was to assume in his lifetime. Mentors still pursue similar tasks.

We cannot separate our career aspirations from other aspects of our development as human beings, citizens and members of our employing organisation. To gain from mentoring, a person has to reach out, grasp and draw into himself/herself the lessons that mentors offer. The mentoree can only experience the beneficial gifts of mentoring by assuming ownership of what the mentor has offered.

Encouragement through coaching is what is needed – not enforcement of rules and regulations as if in a police state, as this would more likely lead to rebellion and mistrust.

Do Exercise 5 – Outreach.

Mentoring and Coaching - Setting the Foundations - 22.1


**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 22
Mentoring and Coaching -
Setting the Foundations**

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This session looks at the difference between mentoring and coaching, and developing mentoring skills. A significant element of this session is the importance of understanding the mentoree's needs.

The exercises in this session – eight in total – provide valuable support to the learning process. They begin with further self-assessment, and take students through some set scenarios to explore how they might react in a mentoring situation. As before there are no right or wrong answers to these exercises.



Mentoring versus Coaching



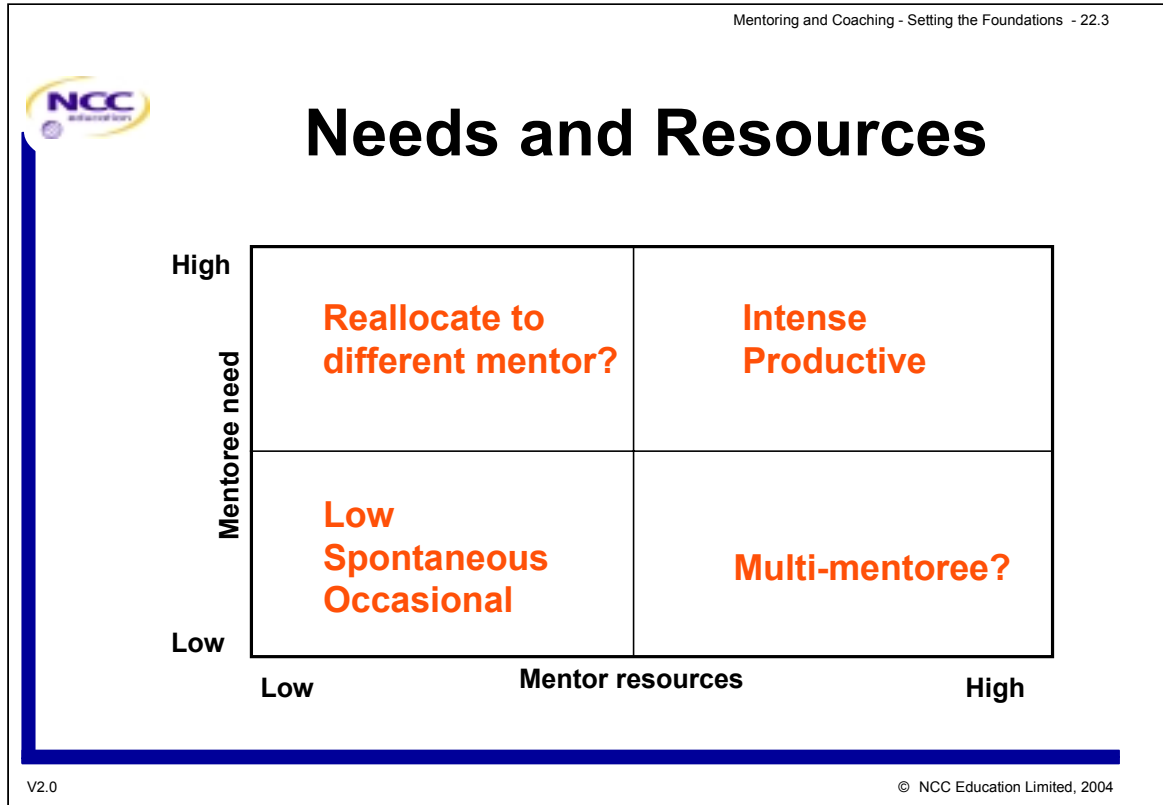
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Mentoring is seen as the process whereby mentor and mentee work together to discover and develop the mentee's latent abilities.

The goal is not a particular position in the company – rather it is empowerment of the mentee by developing his/her abilities.

A coach on the other hand drives the pupil to attain the highest possible goals, and strives to attain those goals to the exclusion of all other things.



Mentoring can range from a spur-of-the-moment intervention to an intense long-term relationship. We need to assess where we are at the moment – recognising that conditions and our interests may need to be re-appraised from time to time.

The needs of the mentoree and the resources of the mentor can vary over time, reflecting the complexities of life.

The mentor's and mentoree's willingness, readiness and appropriateness need to be judged according to the individual situation. A very willing mentor trying to work with a mentoree who perceives little need for help can be inappropriate. Similarly, a needy mentoree and overloaded mentor may not work well together.

Do Exercise 6 – Mentoring Resources.



Sitting Next to Nellie.... Not!

- How rather than what
- “Do it my way”
- Doing it for them
- Emotional cloning



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Sound mentoring respects the uniqueness of the mentoree and strives to enhance the special strengths of that person. Effective mentors tend to focus on what the mentoree did in response to the mentor's help, rather than how he/she did it.

The desire to *do it my way* is critical to the mentoree's sense of self, for it respects that person's individuality. Doing something the mentor's way may lessen mentoree involvement. It may be a way for the mentoree to avoid thought or responsibility. It may also be downright uncomfortable for the mentoree. The mentoree should adapt the mentor's help to his/her own situation and style. This enables the mentoree to wrestle with the details, perhaps try different approaches, and discover their own talents or strengths.

A mentor must not be tempted to take over a task and *do it for the mentoree* – it is important that the mentor lets go, and employs skills that do not inflict too much prescription or direction on the mentoree.

Do not be tempted to take the fairy *godmother* role, and create a clone of yourself – in doing this, you only succeed in passing on your bad habits as well as your good ones!

Do Exercise 7 – Non-directive Mentoring.



Mentor Self-development

- **Basics, fundamentals - not static!**
- **New developments/implications**
- **The mentoring process - skillsets**

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Some of the best mentors are people who assume that they, as well as their mentorees, are in a lifelong process of self-development. We need, therefore to decide what types of mentoring we might practise most successfully and what knowledge and skills we need to develop to stay up to date.

Focus on basic principles and fundamental truths – this may not be a static activity. The application of fundamental truths to new challenges requires constant re-assessment, discussion and even argument until new wisdom is forged. High Court justices, ecclesiastics and good supervisors do this.

Keep abreast of new developments and their implications. This is a more dynamic source of mentoring. It means that a mentor's task of self-development, learning and mastery is never finished. This need not be a heavy task if we choose specialities such as the evolving mission of our organisation or the technology of our given field.

Mentoring itself is an evolving field. If, as a mentor, you choose to master active listening, coaching skills, effective confrontation techniques or new methods of resolving conflict, you are starting a journey of self-development.

Do Exercise 8 – Mentoring Styles.

Do Exercise 9 – Case Study – Chris.



Understanding Mentoree Needs

Recognising the needs of a person, adapting to change, and responding appropriately, is the mentor's challenge



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Any mentoree has some general needs which he shares with others of similar background and situation. He also has his own personal and unique agenda and his own values, perceived limitations and aspirations. Complicating this highly personal equation is guidance from his mentor and other opinions, desires and events that intrude upon the mentoree's daily life.

During the mentoring process, the mentoree is given the opportunity to consider changes offered by his/her mentor, whether they are generated by a challenging opportunity or a revealing, personal insight. This reaction to change is crucial, whether it is self-imposed, a new option or imposed.



Emotions and Feelings

Emotions

- Fear
- Anger
- Grief
- Joy



Feeling = Emotion + Situation

Wherever change occurs, there will be a degree of fear, stress or anxiety – and it is often part of the mentor's role to simply be there for their mentoree, to listen, to comfort and to be a friend.

Do Exercise 10 – Reading Signals.



Managing Change

- **Have vision of change**
- **Time to absorb vision**
- **Time to adjust behaviour**
- **Cope with stress of change**
- **Time to internalise change**

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When a person is undergoing significant change, they usually need five things to adapt successfully:


- A vision of how they and things around them will be when they have changed successfully.
- Time to absorb the new vision.
- Time to adjust behaviour.
- Coping mechanisms to manage the stress of change.
- Time to ponder the meaning of the change, to internalise and own the change.

Context shifting is the key to this process – if a person can clearly imagine what he and his world would be like if he successfully accomplished the desired change, he will begin to do things which move him towards his goals. This mental adjustment needs to be imagined in positive terms, instead of the dread scenarios we often create in our minds. Helping our mentoree to shift their mental context from today's problems to tomorrow's success can be very productive.

We should not expect instant change. In fact, quick change can be so stressful that pain overwhelms us or encourages backsliding.


Do Exercise 11 – Self Image.

Mentoring and Coaching - Setting the Foundations - 22.9



Moving Forward

- Deal effectively with small problems
- Listen for the use of absolutes



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Some mentoree adaptations may be noticeable or even dramatic. Others may be gradual and almost imperceptible. Some may be cloaked. If the mentoring relationship is a continuing one, the mentor may need to:

- Pick up on subtle concerns the other person begins to articulate.
- Notice small or gradual changes which seem significant.
- Read verbal and non-verbal signals coming from our mentorees.

All this can certainly be overdone, but such signals can be clues and cues that help is needed. They may even help to bring the problem to the surface of the mentoree's awareness or to define an emerging difficulty.

Dealing effectively with small problems to keep them from becoming large ones is a primary way mentors can assist their mentorees.

Listen for the use of absolutes – they provide excellent clues, such as

“I never seem to get along with my bosses” or

“He gets to me every time we have a conversation”.

Do Exercise 12 – Recognising Small Problems.

Do Exercise 13 – Case Study – Jill.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

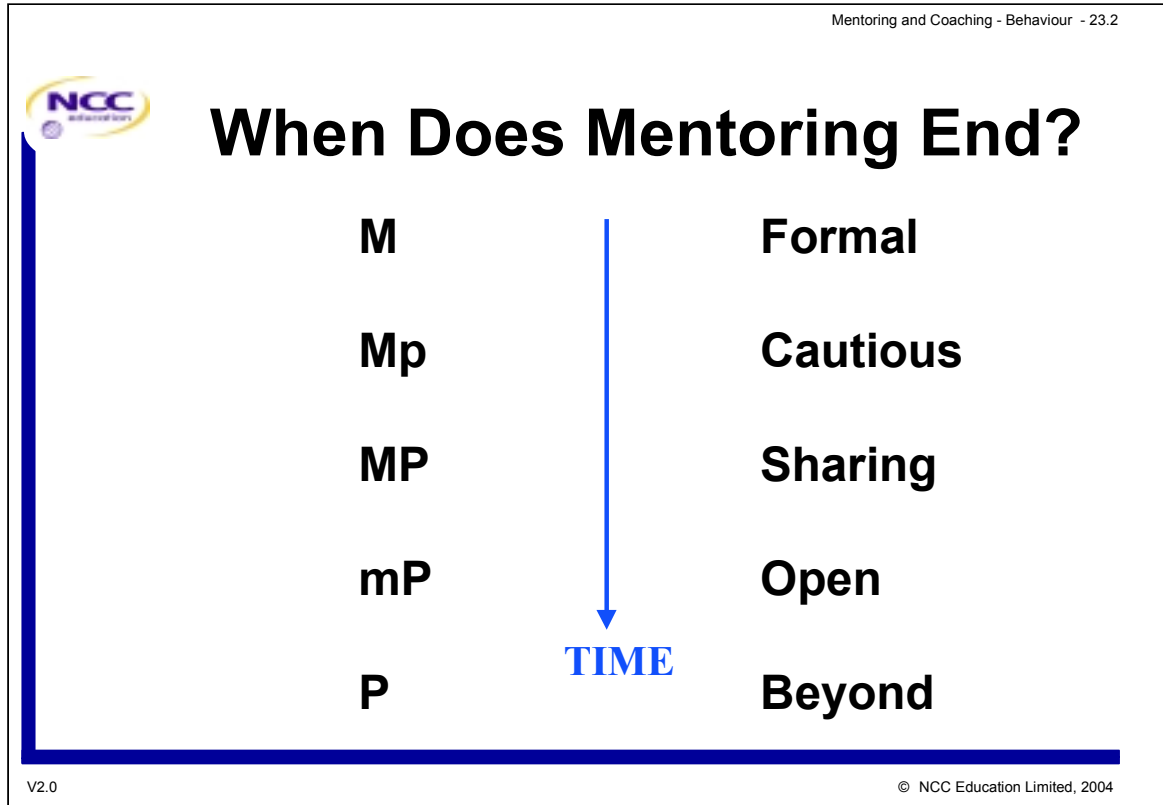
Lecture 23 Mentoring and Coaching - Behaviour

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This session looks at the positive and negative behaviours that may occur in a mentoring situation, and how they might best be handled. Also in this session, we take another look at listening skills – an ideal opportunity to revise some of the earlier material, in a specific context. For completeness, some material is duplicated from the Human Communications sessions.

Five exercises are included in this session – including one role play exercise. This role play should be performed in pairs, with a swap of roles – so every student has the opportunity to play both roles.



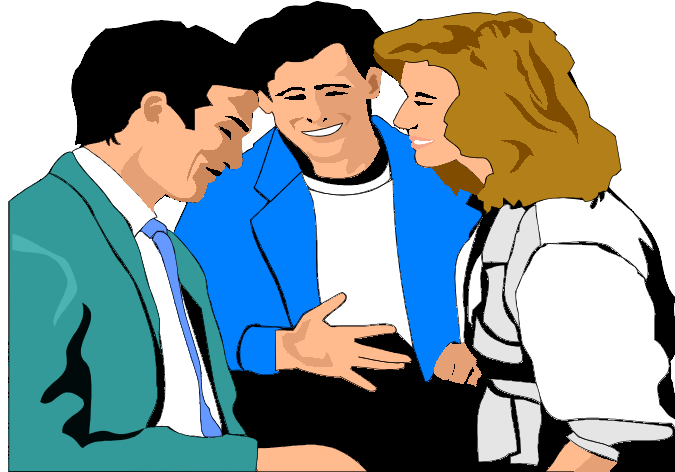
On this visual, the initials in the left hand column indicate the relationship between the mentor and the pupil (mentoree) – the capital letter indicating the balance of power in the relationship.

The natural life cycle of a mentoring process is likely to encounter one or more of these phases. How the relationship moves on through these changes is dependent upon the needs of the mentoree – each represents an important junction in a person's life, and the mentor must be aware of the involvement required and when to back off.

Do Exercise 14 – Moving On/Growth Influences.



Listening - A Core Competence for Life



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As discussed in an earlier session – listening is one of the key core competencies – not only for the competent information systems professional, but for everyone throughout their life.

Providing a listening ear, without taking on the other person's problem, giving advice or joining them in the *isn't it awful* game can serve as a powerful aid to a mentoree. Many mentors believe that respectful listening is the premier mentoring art.

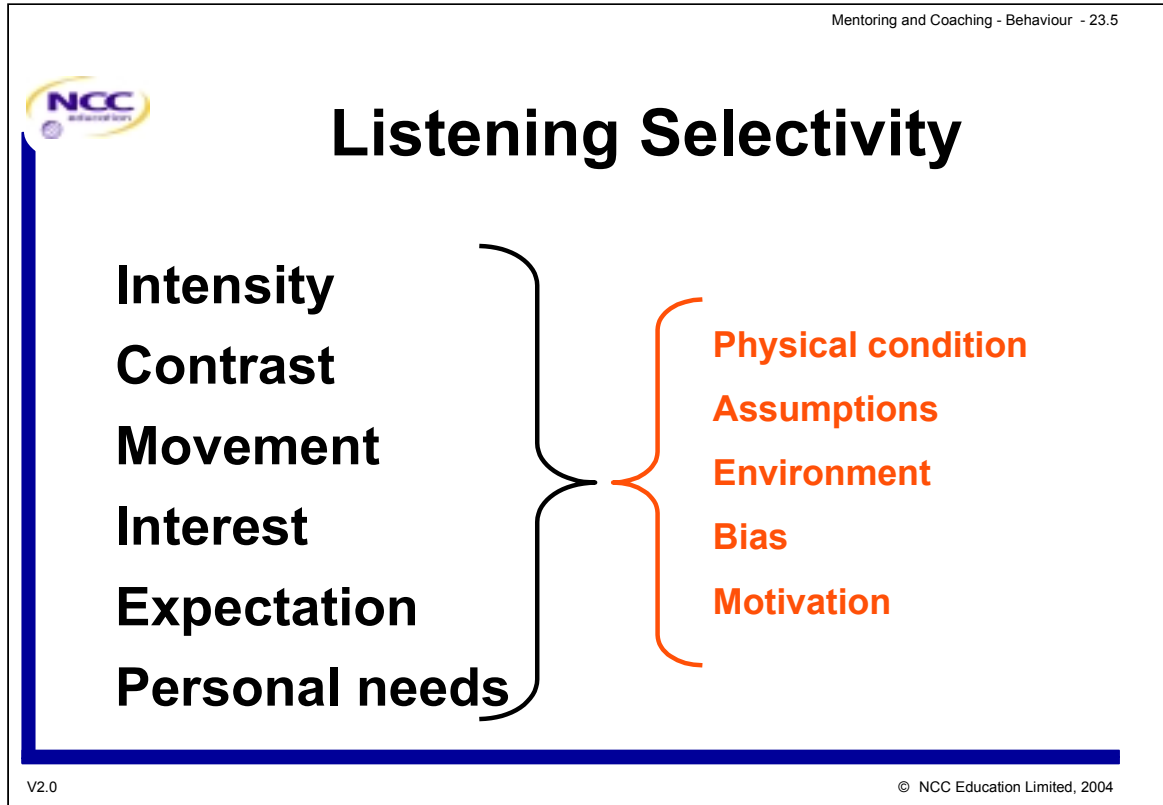


Listening Styles

- **Comprehension**
- **Evaluative**
- **Empathic**
- **Appreciative**

Can you remember the four main styles of listening?

- Comprehension listening is the kind of listening that people engage in when conducting fact-finding interviews or attending lectures. It involves listening to facts, ideas and themes that may be of future use.
- Evaluative listening is the kind of listening people engage in when trying to make judgements concerning the persuasive messages of others, such as sales persons and negotiators.
- Empathic listening is the kind of listening people engage in during counselling sessions, appraisal interviews and, more generally, when faced with someone who has a need to talk and be understood by another person. It involves the listener demonstrating a keenness to attend to and understand the thoughts, beliefs and feelings of the speaker.
- Appreciative listening is the kind of listening people engage in for pleasure. It might occur when listening to music, poetry or children playing. It involves the listener seeking out signals or messages that he/she wants to hear.



There are many competing demands for a listener's attention. An interviewer might be more interested in how the candidate is dressed – a mark on his tie, or the aura of tobacco smoke that surrounds him.

A colleague's loud voice might be a distraction, or the interviewer might only notice a hydraulic drill when it is switched off, or attention might be drawn if a person changes from a relaxed posture to bolt upright.

Background and culture might influence the meaning attributed to certain behaviours – being aware of one's own personal filters can help a person listen more effectively. An interviewer should prepare a checklist to help make sure that attention is paid to all the relevant messages, and that the effects of selectivity are minimised.

The message itself can influence how much is received. If it is bad news, or the listener does not want to know, then the tendency is often to *switch off* the listening process.

Auditory noise is only one of many environmental problems; the listener's attention might be drawn by an interesting poster, or an attractive view from a window.



Speech Rates

Normal speech rate	140 wpm
Preferred (more believable)	190 wpm
Upper limit	280 wpm
Lower limit	125 wpm

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The speech rate can significantly affect the listening ability of others. Normal speech is said to be around 140 words per minute – but it has been claimed that listeners prefer to listen and can comprehend better, and are more likely to believe the message that is presented at 190 words or more per minute.

Listening can be possible up to around 280 words per minute – but much higher than this and concentration begins to deteriorate. Although people can think at a rate considerably faster than this, they require a reasonable differential between speaking and thinking rates to process what they have heard.

Slower rates – below 125 words per minute can impair effective listening, just as much as excessively fast rates. The listener's capacity to process information is under-utilised, so attention begins to drift.



Active Listening

- **Attending**
- **Listening**
- **Empathy**
- **Probing**



Attending – physically and psychologically.

Listening – receiving and understanding – verbal and non-verbal.

Empathy – within the speaker's frame of reference.

Probing – more concrete and specific.



Listening Preparation

- **Timing**
- **Receptivity - single minded**
- **Environment**
- **Background knowledge**

The kind of preparation that the listener can engage in involves the following.

- Arranging important listening tasks for a time when he/she is least likely to be stressed or fatigued.
- Increasing his/her receptivity by making a conscious effort to put aside temporarily preoccupying concerns, such as a recent row with the boss or the need to book a holiday flight as quickly as possible.
- Arranging an environment that contains as few distractions as possible, thereby encouraging all parties to concentrate on communicating.
- Reviewing background material such as notes and reports or issues to be discussed. This kind of preparation can stimulate interest and help create the right mental attitude.



Attending

Squarely

Open

Lean

Eye contact

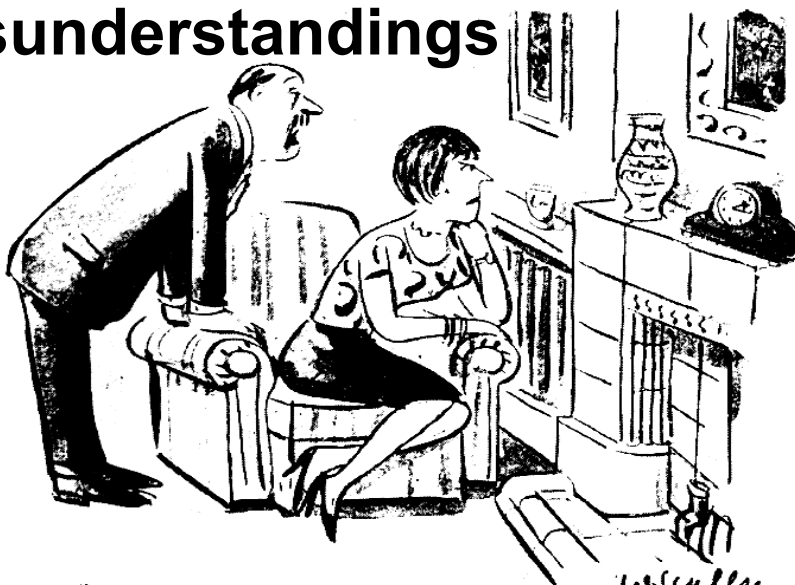
Relaxed

Remember the SOLER mnemonic:

- Face speaker **S**quarely.
- Adopt **O**pen posture.
- **L**ean upper part of body towards speaker.
- Maintain good **E**ye contact.
- Try to be **R**elaxed.

Mentoring and Coaching - Behaviour - 23.10

NCC **Misunderstandings**



'Is it something I've done? Is it something I've not done? Is it something I've said? Is it something I haven't said, or is it the way I didn't say it?'

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Resolving misunderstandings, can be a very painful and difficult experience – if you believe that a misunderstanding has taken place – try and resolve it as soon as possible.



Following

- **Door openers**
- **Invitations**
- **Silence**
- **Attending**

The listener can:

- encourage the speaker to talk;
- better concentrate on the task of listening;
- gently seek out more information to help promote a better understanding of the speaker's message;

by using door openers, minimal prompting, accents, statements, questions, attentive silences and a number of special concentration techniques.



Minimal Prompts

Mmm...

Yes...

Right!

Really!

And?...

Wow!

And then?...

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A door opener might be a description of body language:

- “You are not looking yourself today” or “you sound a bit low”

A minimal prompt might be:

- “mmm”, “really?” or “tell me more”

An accent is a restatement of one or two words and might be:

- Manager: “The report seems OK”
- Colleague: “*Seemed* OK?”
- Manager “Well, what I expected was”

Infrequent questions; generally we ask too many questions. It is often only necessary to ask questions when we believe that the speaker has more to say, but does not know how to say it.

“Could you say a little more about why negotiations broke down?”



Accent

- **How** are you?
- How **are** you?
- How are **you**?

*Say “how are you” three times, each time with the accent on a different word.
How is the meaning of the question altered with the accent in each place?*



Questions or Statements

Clarification or interrogation?



Questions tend to relate more to the concerns of the listener

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If the listener asks too many questions the speaker might end up feeling that he is being grilled. An alternative to some questions might be the kind of statement that makes a demand on the speaker to say more, to elaborate or clarify.

For example, the statement: *“What you have been saying seems to have made you very angry”* might encourage the speaker to talk about his feelings of anger without feeling that he is being quizzed.



Concentration/Receptivity

- **Why am I being told this now?**
- **Am I paying attention?**
- **Am I focussing on the key words?**
- **What is this person really saying to me?**

The listener can improve his/her ability to follow what the speaker is saying by using one of a number of techniques that aid concentration. The listener concentrates on what the speaker is saying and heightens his/her receptivity by asking him/herself questions such as those shown on the visual.



Reflecting

- **Paraphrase**
- **Reflecting back**
- **Summative reflection**

Reflective listening is the skill of mirroring back to a person, in your own words and manner, what someone is saying to you. This can be either through paraphrasing a message, reflecting feelings if there is a high emotional content to the message, or by trying to pick out hidden meanings if a speaker is having difficulty with an issue. It allows speakers to hear what they are saying, see what they are meaning and feel what is happening and, through this process, come to a better understanding of themselves and their situation.

Paraphrasing what the other has said also goes a long way towards preventing misunderstandings. We often think or feel that we understand what a person has said but this is just guesswork, unless we check our understanding out with the speaker.

In summary:

- Reflect the content of the message.
- Be short and to the point.
- Reflect only the essentials of the message.
- Use your own words.

Mentoring and Coaching - Behaviour - 23.17

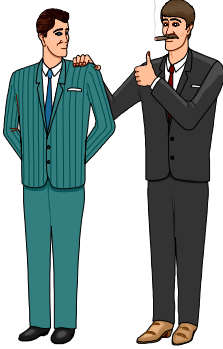
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Touch

Pat, slap, tickle, pinch, stroke, kiss, hold, kick, punch

Touch and release
Touch and hold
Touch and stroke

Intimacy level



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Bodily contact and touching behaviour is the most basic way in which people can express such interpersonal attitudes as aggression and affiliation.

Children pat, slap, tickle, pinch, stroke, kiss, hold, kick and punch much more than adults do. Maturity tends to bring with it a considerable reduction in touching behaviour, many of the functions normally served by such behaviours being fulfilled by facial and gestural expressions.

Nonetheless, adults touch others to offer encouragement, express tenderness and show emotional support. They also touch others, but in different ways (slapping, punching, kicking) to express aggressive interpersonal relationships.

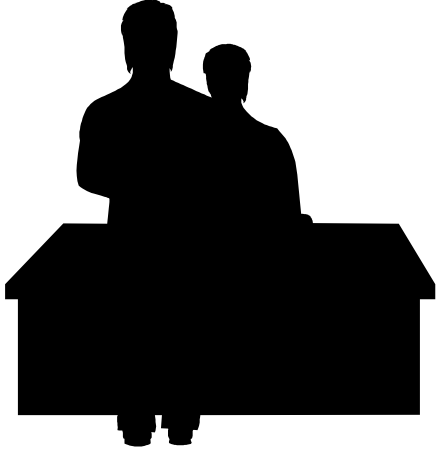
It is possible to plot touch behaviour along an intimacy continuum, ranging from touch and release (pat) being the least intimate, through touch and hold, to touch and stroke – the most intimate.

Mentoring and Coaching - Behaviour - 23.18



Furniture

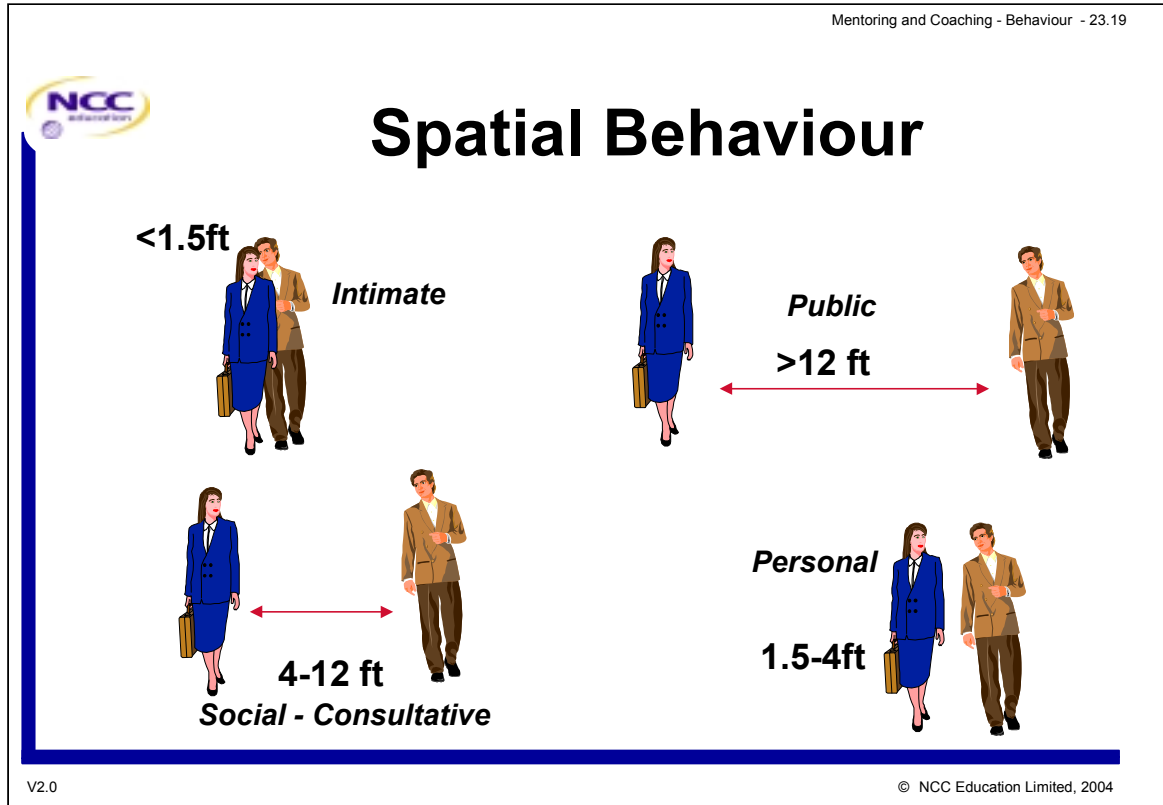
- **Separators**
- **Lighting**
- **Height**



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It has long been recognised that the shape of a table in a meeting room, the layout of chairs in a lecture room and the arrangement of furniture in a sitting room can have an important effect on the flow of communication. For example, people sitting along the same side of a long boardroom table may experience problems in communicating with each other because eye contact – apart from that with immediate neighbours is difficult.

Furniture can be used to key the climate for an interaction. Sitting behind a desk with your back to a window so that a visitor can only see a silhouette of your face deprives the other person of the opportunity to observe your facial expression. Experiments suggest that the silhouetted person is likely to be perceived as being more dominant, especially if the visitor is seated in a lower chair.



The distance between people when they are communicating, signals something about the nature of their relationship. Four proximity zones have been suggested for different kinds of relationship – as shown on the visual.

In the UK, friends or colleagues talking about agreeable matters tend to stand about 24 inches apart. Problems sometimes arise when people from different cultures, with different concepts of personal space, engage each other in conversation. One may feel comfortable standing close to the other, whereas the other may experience discomfort because he feels that his personal space has been invaded.



Appearance

Height - Weight - Dress - Hair - Body decoration

- Know first, who you are; and then adorn yourself accordingly

Epictecus

(Nowadays - know where you are, and the image you wish to project)

- Never have your best trousers on when you turnout to fight for freedom and truth

Ibsen

Appearance can convey messages about one person's attitude towards others. Certain kinds of clothes worn within a certain context might signal a person's sexual availability.

Respect for another might also be communicated through appearance. Arriving at a mentoring session in worn, dirty, casual clothes might give your mentoree the impression that he/she is not highly regarded or respected.



Believability

- **Autonomic**
- **Leg and foot signals**
- **Trunk signals**
- **Unidentified hand signals**
- **Identified hand signals**
- **Facial expression**
- **Verbalisation**

Least controlled

Most controlled

V2.0

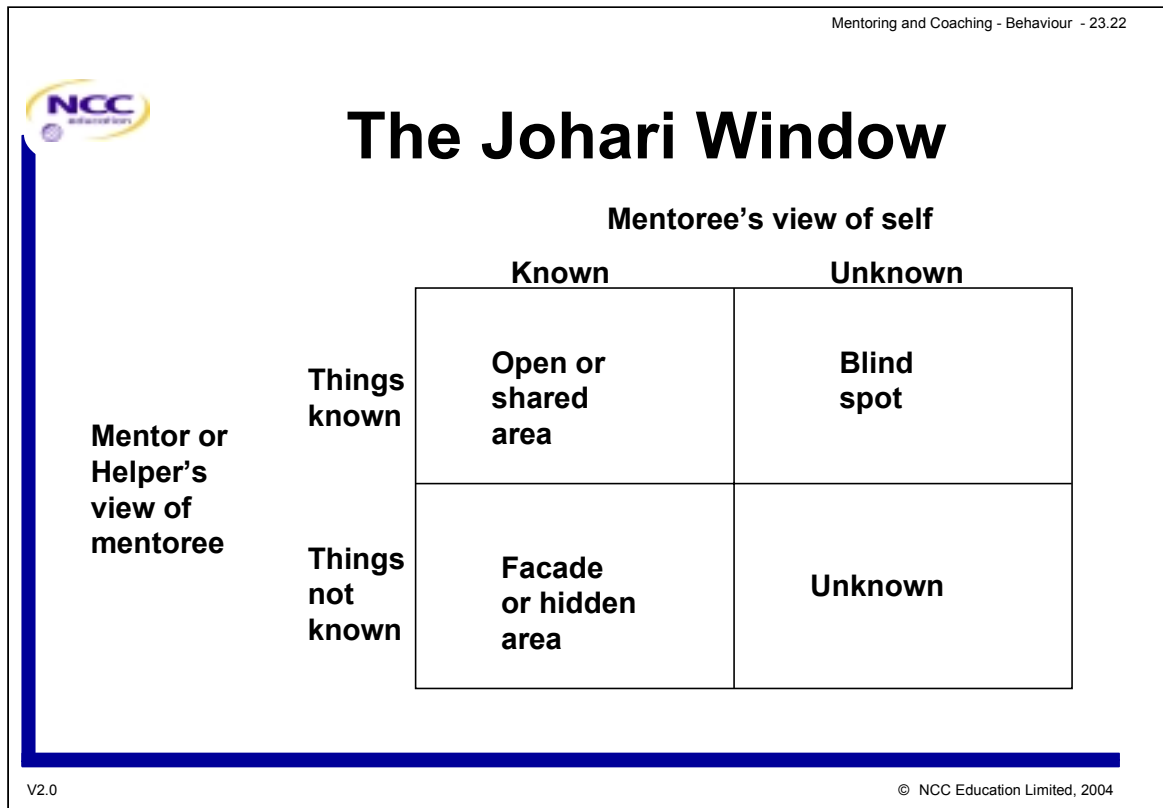
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What is the true meaning of the message if a red-faced man bangs the table with a clenched fist and declares that he is not angry?

Research evidence suggests that non-verbal behaviours generally offer the most reliable clues to what a person is really feeling, in spite of his denial that he is angry.

It appears that people are less likely to inhibit or manipulate certain signals. These tend to be those which they are least aware of, believe others pay little attention to or are beyond their control. In decreasing order of believability the following seven elements are proposed.

- *Autonomic signals* – such as perspiration, skin colour and respiratory patterns.
- *Leg and Foot signals* – such as tightening of leg muscles and jerky, aggressive foot actions.
- *Trunk signals* – such as muscular tonus of the whole body affecting posture.
- *Unidentified gesticulations* – such as assertive finger wagging, imploring palm-up hand gestures or hand chops.
- *Identified hand gestures* – such as thumbs up.
- *Facial expressions* – such as anger or surprise can be easily faked, but look out for the frozen smile hidden underneath!
- *Verbalisations* – people are able to exercise most control over the verbal messages – and therefore they are the least reliable guide to true feelings, when contradictory signals are observed.



This two dimensional matrix known as the Johari window – depicts a need to be aware that your mentoree is only going to make available selected information to you as mentor.



“I” Messages

- **Tell the mentoree how you feel, but not how to behave**
 - **Part 1 - Neutral description of the intention**
 - **Part 2 - Statement of possible effects**
 - **Part 3 - Your feelings (I’m...)**
- **Never “I think you’re wrong”
“I think you should... “**

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Sometimes a mentor finds it important to confront the attitude, behaviour or plans of his mentoree. To criticise, threaten or pressure the mentoree to adopt another course may lower the mentoree’s self-esteem. It may be ineffective – the mentoree may retreat with her plans or actions. It may generate resistance or hurt the relationship.

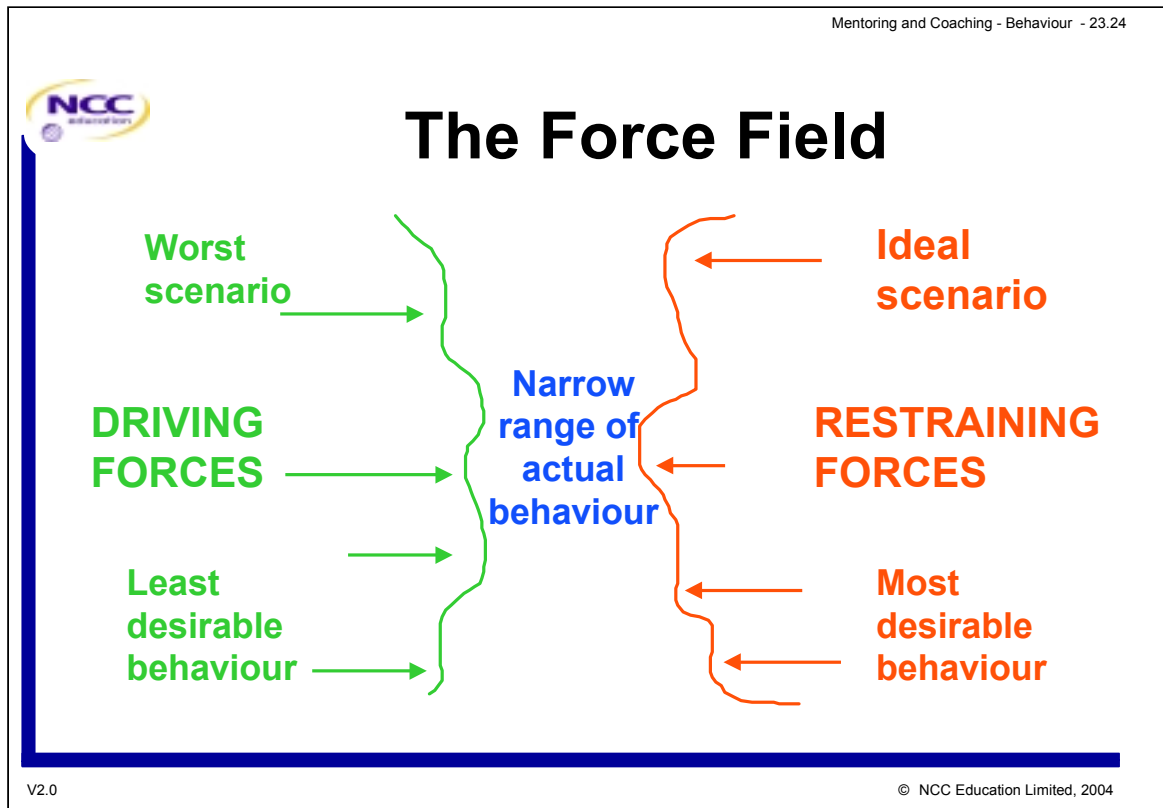
Communication specialists have found that an “I” message confrontation – an authentic message directly from the mentor – is the most effective way to bring about helpful change in the mentoree.

An “I” message generally contains three parts:

- A neutral description of what you perceive the mentoree intends.
- A statement of the possible negative effects on the mentoree or other people.
- The feelings or emotions you are having about the mentorees plan.

An “I” message works because it does not tell the mentoree how to behave. The mentoree makes the decision.

Do Exercise 15 – “I” Messages.



In any mentoring relationship there are likely to be driving and restraining forces where conflicts occur. Careful selection and management of behaviours can influence the long term effectiveness of your mentoring activity.

Do Exercise 16 – Mentoring Conflicts – Role Play.



Criticism

Implies:

- Judgement
- Complaint

Leads to:

- Low self-esteem
- Defensive blocking



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Most people do not take kindly to criticism – even when it is offered as *constructive criticism*. Criticism is evaluative and judgmental, no matter how we dress it up. When we offer constructive criticism, we want our message to be helpful to the person. But our intentions are undercut by the way that criticism damages self esteem, generates defensive blocking and drains the energy needed for constructive action.

Also if the person accepts the criticism, he acknowledges that he has been bad or wrong – something he is unlikely to do if he is doing wrong intentionally, and something he should not do if he has not been doing wrong at all.

The key to success is to take new, objective and creative approaches to encouraging beneficial change, rather than to repeat ourselves endlessly and negatively as critics tend to do.

Do Exercise 17 – Constructive Criticism.



Advice

Implies:

- Superior knowledge
- Insight
- Wisdom

**May be true in professional areas, but
not necessarily in personal areas**

“Yes, but ...”

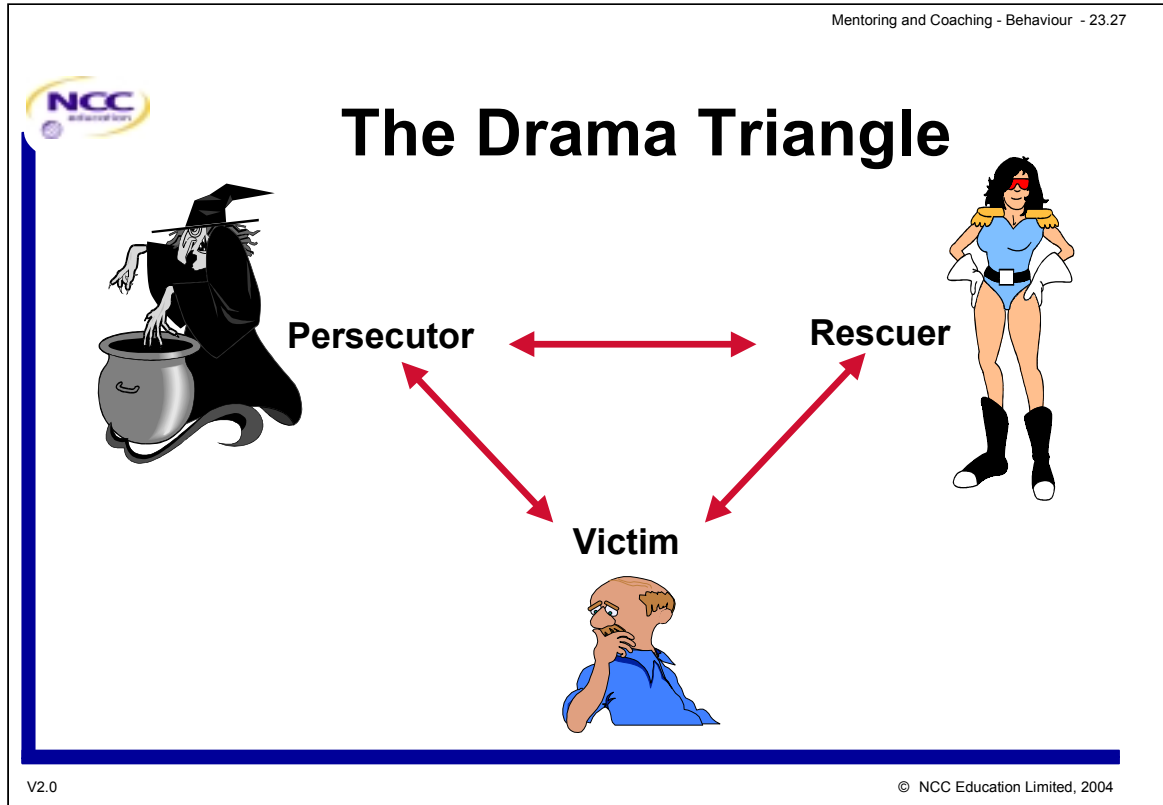
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Many mentors believe that a large part of their job is giving advice to their mentorees. There is a downside to giving advice. When we give advice, we assume we have superior knowledge, insight or wisdom related to the problem. This may be true when we are engaged in professional discourse.

Most independent-minded mentorees do not really want advice, though they will value your experience, ideas, knowledge of how things work and special insights into problems. To keep them independent, offer but do not push. They must learn to make their own decisions, if they have not already.

Do Exercise 18 – Case Study – Kate.



This drama triangle is a way of analysing psychological games, which illustrates why people often resist taking advice.

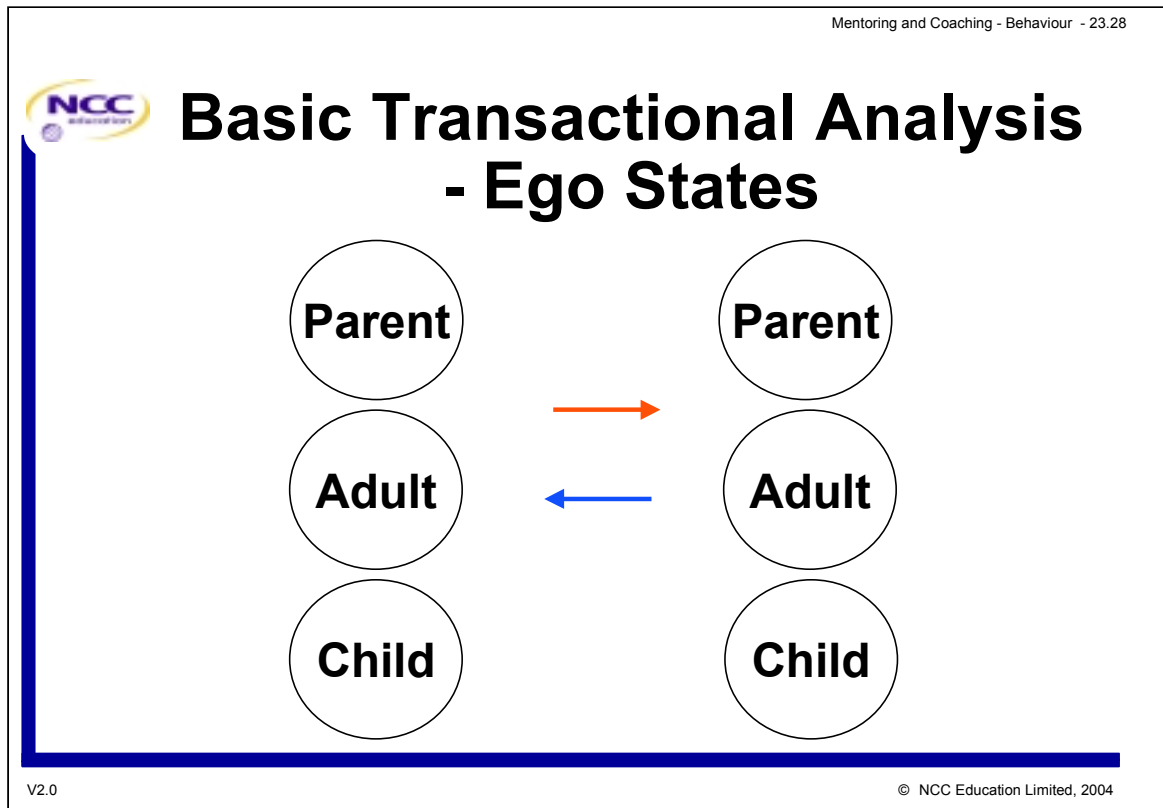
When a person feels victimised by a problem, he may send a plea for help to a person he perceives as able to rescue him (i.e. as more capable than himself). The victim's feelings of inadequacy are real but his lack of ability usually is not.

The would-be rescuer accepts the inadequacy of the victim and offers advice. In doing so, he/she contributes the "why don't you – yes, but" psychological game.

Most often the victim rejects the advice with "yes, but", followed by a reason for not taking the advice. This is hardly surprising, since he knows all the facets of his problem and has probably already considered and rejected all the easy answers.

The rescuer has only the information that the victim gives in response to each suggestion. He/she keeps making suggestions, each of which is rejected for some new reason. Finally, the rescuer grows impatient with the rejections and turns persecutor. She says something to the effect of "Buzz off – you don't really want to solve this problem".

At that point each party is confined in his or her own judgement. The victim feels even more like a victim. He not only still has the original problem, he also has the would-be rescuer exasperated with him. The would-be rescuer has confirmed his belief that the victim was and still is inadequate. The victim is also convinced that his problems are too big to be solved by anyone. The relationship has been damaged.



Transactional analysis provides a useful model for understanding the nature of interpersonal relationships. Personality is presented in terms of three ego states – Parent, Adult and Child.

- The parent ego state comprises a set of feelings, attitudes and behaviours that have been copied from parental figures (nurturing, standard setting, criticising and judging).
- The child ego state comprises a collection of feelings, attitudes and behaviours that are the remembered reactions to parental behaviour including guilt, anger, rebellion, excitement, joy, sadness and fear.
- The adult ego state comprises a set of feelings, attitudes and behaviours associated with information processing and objective testing of reality.

The balance of these ego states may vary from person to person, and within the same person from time to time. It is the ego state that predominates that determines behaviour. On one occasion a person may behave as an Adult and on another occasion the same person may behave as a critical parent.

This model can be usefully used to improve a person's awareness of their own personal style. The basic unit of behaviour is referred to as transaction. It involves one person doing or saying something to another and the other responding. By analysing a series of transactions it enables a greater understanding – and therefore possible improvement – of a particular relationship.




Summary: Managing Relationships More Effectively

- Awareness of need
- Read behaviour
- Ensure desired outcome

An awareness of one's own and others' needs can enable a person to assess what he/she needs to do to make his/her behaviour more effective.

Further interpersonal competence comes from the ability to understand the nature of social interactions, to be able to read behaviour, and to act in ways that will bring about desired outcomes.

Mentoring and Coaching - Gains and Difficulties - 24.1


**Postgraduate Diploma
in
Strategic Business Information Technology**

**Module 2
Task Management**

**Lecture 24
Mentoring and Coaching -
Gains and Difficulties**

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This session explores some of the mutual gains that can be made from mentoring, and the problems that can arise out of difficult or special situations.

Pressures, stress and the effect of diminishing returns are also covered – to ensure that the mentor is able to judge the appropriate action depending upon the state of the mentoree, and their workload.

Eight exercises are included in this session – including one role play exercise. This role play should be performed in pairs, with a swap of roles – so every student has the opportunity to play both roles.



Partnership



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Mentoring is often perceived as a one-way street, with the mentor giving and the mentoree receiving. In the past, this top-down, parent-to-child relationship was often based on the assumption that the mentoree was not in a position to do much in return except be a dutiful and appreciative protégé.

In the past this often worked, giving career success to the mentoree and a type of parental satisfaction to the mentor. But it tended to produce clones and prepare people to succeed in a world which is now passing. In these days of self-empowerment and rapid organisational and professional change, the senior-junior model needs revision.

Today, mentoring may be viewed as a partnership, with both parties freely contributing to the discussion as equals working together, based upon mutual respect. A mentor may still have greater experience, insight and wisdom but the relationship can be one of showing rather than only top-down giving and receiving.

Mentoring is not a bookkeeping exercise. There is no need to balance accounts or to give back in kind. Yet, a two-way flow of kindness, respect or giving can return much to the mentor.

Do Exercise 19 – Partnership.



Mentor Expectations

- Satisfaction
- Recognition
- Reward
- ?

As a cultural value, generosity is extolled. We give for the love and care of our fellow human beings. This giving is usually honest and sincere. But since we also have needs we hope that others will apply the golden rule and that some joy will come our way. If it does not, we may be disappointed and possibly resentful.

Accepting that each of us has needs, and being open and honest about them, can help us to make our expectations explicit. Failing to state our expectations of another person is all too common and unfair. Both mentorees and mentors need to be explicit about what they hope to gain from the relationship.



Mentoree Expectations



**Do not assume
Find out first**

The expectations of your mentoree will vary from situation to situation, and from person to person. It is important that you establish what their expectations are at the outset of the mentoring relationship, otherwise you are heading straight for failure.

You could do this by asking the mentoree to write a brief essay of one or two pages describing what he/she expects to gain from the relationship – short term and long term. Ask the mentoree to list any special needs or features of the relationship that should be considered in developing the relationship.



Mentoring Agreements

- **Expectations**
- **Reconciliation of views**
- **Written or verbal**

When formal mentoring arrangements are established, usually sanctioned by the employer, school or other agency, a mentor-mentoree agreement may be helpful.

When both parties in a mentoring relationship have made their expectations clear, reconciliation of views may be necessary. At least they should define how they will work together and what they hope to achieve through this association.

Their agreement may not be formal or even written down – it must be remembered that mentoring is a friendly, helping, informal relationship – and any effort to extract promises is probably based on fear, mistrust or hostility.

Exercise 20 – Mentoring Agreements.

Mentoring and Coaching - Gains and Difficulties - 24.6



Implementing Mentoring

How might you implement a mentoring programme in your organisation?

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After discussion of this topic in class, Exercise 21 – Action, should be completed.



Special Situations

- **Cross gender mentoring**
- **Cross cultural mentoring**
- **Cross hierarchy mentoring**

We are now going to look at some of the difficult situations that can arise when different types of people become paired up in mentoring situations.

These represent the three primary challenges in mentoring when it is used to:

- adapt our workforce to demographic changes already under way;
- prepare us to operate in a competitive global environment;
- manage organisational and technological change effectively.



Cross Gender Mentoring



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Until recent decades, cross gender mentoring in organisations has been rare. Several studies of mentoring reveal a number of problems related to *cross gender mentoring* based on gossip, envy, suspicion, speculation, false assumptions, sexual stereotypes and charges of sexual harassment. Unfortunately, such attitudes and behaviour have lessened the effectiveness of cross gender mentoring in some environments. Yet each sex has much to offer and teach the other.

Cross gender mentoring can improve morale, enrich the lives of mentorees and provide valuable insights and experiences to each sex.

A gender-balanced and fairly treated workforce is likely to remain a challenge rather than a reality for some time. Effective cross gender mentoring is one of the tools we can use to achieve this balance and fairness.

Do Exercise 22 – Cross Gender Mentoring.



Cross Cultural Mentoring



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Signs of cultural diversity are virtually everywhere – and this diversity represents some of the most subtle and special relationships imaginable. Even in a relatively homogeneous society, differences in economic class, religious background, regional allegiance and even family traditions can generate cultural differences which can complicate the task of mentoring.

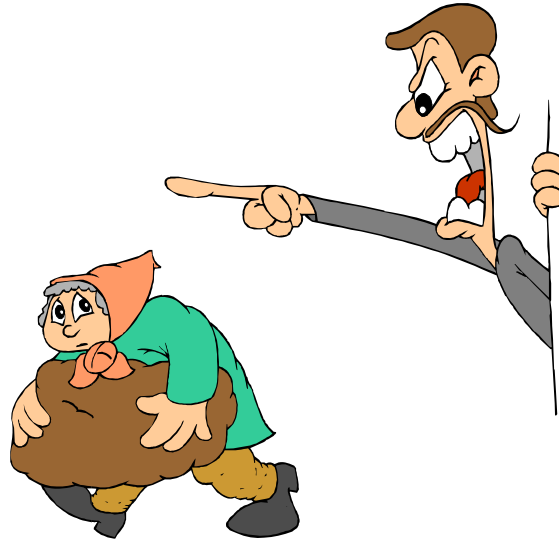
Cultural differences and our personal response to them are a large part of what makes each of us unique. Our cultural heritage may also enable each of us to appreciate special facets of a problem, approach its solution from different angles and contribute to a more comprehensive solution.

We can trace the origin of a plate of spaghetti to China, modern medicine to the ancient Arabs, the roots of Christianity to the Hebrews of old, or modern dance rhythms to Africa. Our lives have gained richness and variety from people all over the world, whether we are aware of it or not. The contributions are almost endlessly varied.

Do Exercise 23 – Cross Cultural Mentoring.



Cross Hierarchy Mentoring



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Some of the most powerful, effective and long-lasting mentoring can be done by the person who has authority over the mentoree – and this can include parents. The power or authority to reward and punish people creates both opportunities and obstacles to effective mentoring.

The possession of power or authority over a mentoree can work against a helping, caring, nurturing relationship. It is difficult for a mentoree to become her own person when she is subject to pressures from others.


Power and authority, however, need not be used negatively. Used wisely, to challenge, to offer opportunities and to encourage, power and authority can provide powerful assistance to a mentoree.

Mentoring by a supervisor or line-manager must be done carefully, artfully and fairly. In one respect, bringing out the best in each employee may well define the art of supervision. Mentoring can contribute strongly to the development of that art.

Hierarchy is not simply a matter of placing people on an organisational ladder. We have hierarchies of knowledge, of experience, of seniority and yes, of position and power. Hierarchies of influence, personal complexities and abstraction also exist.

Do Exercise 24 – Cross Hierarchy Mentoring.

Mentoring and Coaching - Gains and Difficulties - 24.11



The most useful skill of them all...



The answer to every problem known to humanity

.... is knowing our own limitations

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Knowing our own limitations, and being able to admit that we don't know – or can't do something, is one of the most useful skills that a professional person can have.

It must be remembered that, even as a *mentor*, you cannot be expected to be able to help your mentoree in *every* difficult situation that he/she might face. You owe it to both yourself and your mentoree to admit when you are out of your depth.

Mentoring and Coaching - Gains and Difficulties - 24.12



Specialist Areas

Stress Redundancy (or threat)

Pregnancy Retirement Performance appraisal

Disciplinary interview Psychometric testing

Relocation Sexual Harassment

Specific Schemes Debt Substance misuse

Violence/Trauma Relationship issues

Bereavement Chronic sickness

Depression Psychiatric problems

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Knowing a route to solving some of the specific specialist problems that you might be confronted with – is likely to be the best that you can offer in terms of constructive suggestions



But You Can

- Listen
- Be the one to recognise the problem
- Address your own prejudices
- Be alongside



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But you can, after all, listen and provide an unbiased, unprejudiced ear and be available if needed at times of crisis.

Do Exercise 25 – Sam, Role Play.



Summary

Mentoring can be

- Formal or informal
- Long or short term
- Single action or agreed plan

To summarise this final mentoring session – you can make mentoring formal or informal, it's up to you!

It can be a long or a short term investment, a single action, or an agreed plan.

The success of your relationship depends upon the commitment you and the mentoree are willing to make to meet the challenges and capitalise on the opportunities.



Postgraduate Diploma in Strategic Business Information Technology

Module 2 Task Management

Lecture 25 Task Management - Summary

This summary session to the Task Management module reviews the objectives of the module, recaps on the major topics that have been discussed throughout and provides an opportunity to re-run an exercise that was run during an earlier session that will help strengthen the usefulness of the material.



Task Management Module Objectives

- **Evaluate requirements and managerial constraints**
- **Apply resource and time management techniques**
- **Integrate appropriate styles of leadership and behaviour**
- **Reconcile human communications with task**
- **Appreciate need for mentoring and coaching**

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The objectives of the module have been to equip the students with the skills to be able to:

- evaluate the requirements and managerial (financial and temporal) constraints within which a task has been specified;
- apply resource and time management techniques to plan and deliver achievable objectives meeting the established requirements within the stated constraints;
- integrate the appropriate styles of leadership and human behaviour into the task management process;
- reconcile the issues and concerns of human communication within task management;
- reflect upon the differing role of mentoring and coaching by evaluating their benefits and difficulties from the perspective of both the mentor/coach and those assigned to them.



Topics Covered

- **The task envelope**
- **Time management**
- **Principles of human communications**
- **Resource management**
- **Principles of human behaviour**
- **Mentoring and coaching**

The module explored each of these topics over a series of sessions.

The emphasis has been placed on the human aspects of task management that are essential for all IS professionals.



The Task Envelope

- What is success?
- Initiating the task
- Supporting disciplines
- Managing risk
- Completing the task



Many of the sessions, both in this topic and in the others, were based on the assumption that it is possible to establish concrete success criteria – so this was covered in some detail in the first session. We come back to this to complete this session later.

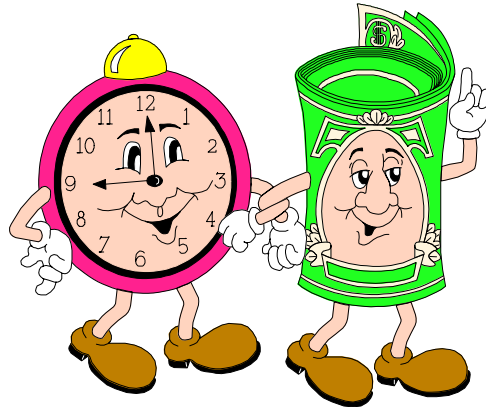
The remaining sessions focussed on the task in hand – how it is initiated, how the conflicting constraints of cost, time, quality and content can be managed, the supporting disciplines that are necessary to deliver a quality product from the task such as Quality Assurance (QA), Configuration Management (CM) and Verification and Validation (V&V). We also looked at the delivery options and relationship with the *client*, whoever the client might be.

Now that the students have explored what they should be doing, how would they go about changing the approach – not only of themselves – but also that of their colleagues and organisations?



Time Management

- Managing your time
- Managing meetings
- Managing the time of others



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In a human resource intensive industry like Information Systems, time is one of the most critical resources for undertaking a task.

This topic looked at the different requirements and techniques that are available to help improve the effective utilisation of this critical resource.

The sessions focussed on these three aspects, and provided the opportunity for a significant amount of discussion and practical work.

How do students believe they could improve on their time management skills?



Principles of Human Communications

- Introduction to communication skills
- Listening skills
- Interviewing skills
- Negotiating skills



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People are by far the most important and expensive asset a business owns. Although most people cherish their most valuable assets, unfortunately human factors are often totally ignored in the business environment, with predictably bad consequences.

This, and the subsequent sessions on human behaviour and mentoring, therefore form the human factors element of the module.

The sessions discussed the following aspects.

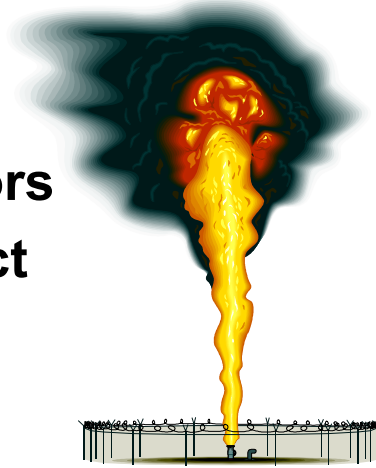
- The communication loop – message, media and method, the strengths and limitations of language, barriers and filters, the audience, working in groups.
- Difference between hearing and listening – different approaches to listening, the use of silence, reflective listening, listening to non-verbal messages.
- Interview as a social encounter – bias, behaviour, organisation of topics, formulation of questions, probing and clarification, closure.
- Negotiation looked at strategies, bargaining, concessions and settling.

How do the students believe that they can improve their communication skills, and help to make their organisations more 'people oriented'?



Resource Management

- Managing internal resources
- Managing subcontractors
- Acquisition and contract management



Focussing on people again, these sessions looked at how to make the most effective use of existing resources, and how to obtain resources that the business does not currently own or employ.

How do the students believe they could improve on their delegation skills, and improve the procurement processes embedded in their organisations?



Principles of Human Behaviour

- Leadership and motivation
- Team factors
- Innovation, quality and productivity



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These sessions discussed:

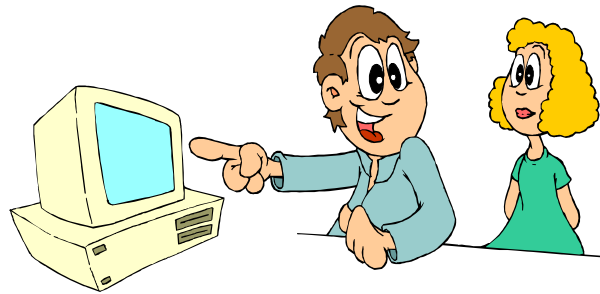
- Leadership and behaviour preferences – the importance of leadership, Maslow's hierarchy, motivations and incentives, preferred learning styles.
- Team Building – the balanced team, steps to a successful team, team roles.
- Approach to innovation, significance of quality and productivity, involvement and commitment.

Students should think about their understanding of human behaviour, and how it will affect their interactions with colleagues, managers and subordinates.



Mentoring and Coaching

- **Mentoring and coaching roles**
- **Mutual gains and difficulties**
- **Pressure, stress and diminishing returns**



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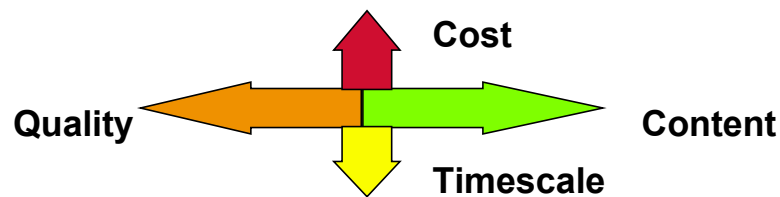
During these sessions, in addition to discussing the topics listed below, there was significant opportunity for practical exercises.

- The mentoring role.
- Mutual gains.
- Mentoring difficulties.
- The difference between mentoring and coaching.
- Pressure, stress and diminishing returns.



Critical Attributes

Those which if not achieved mean the task or project is a failure



This is one of the key visuals of the entire module.

The following visuals pose questions which explore the reasons for failure to achieve in each of these four dimensions. Repeating this exercise here should indicate to the students how their understanding of these criteria has changed over the course of the module.



Budget

- **Has the task met its budget targets?**
- **What could cause the answer to this question to be “No”?**

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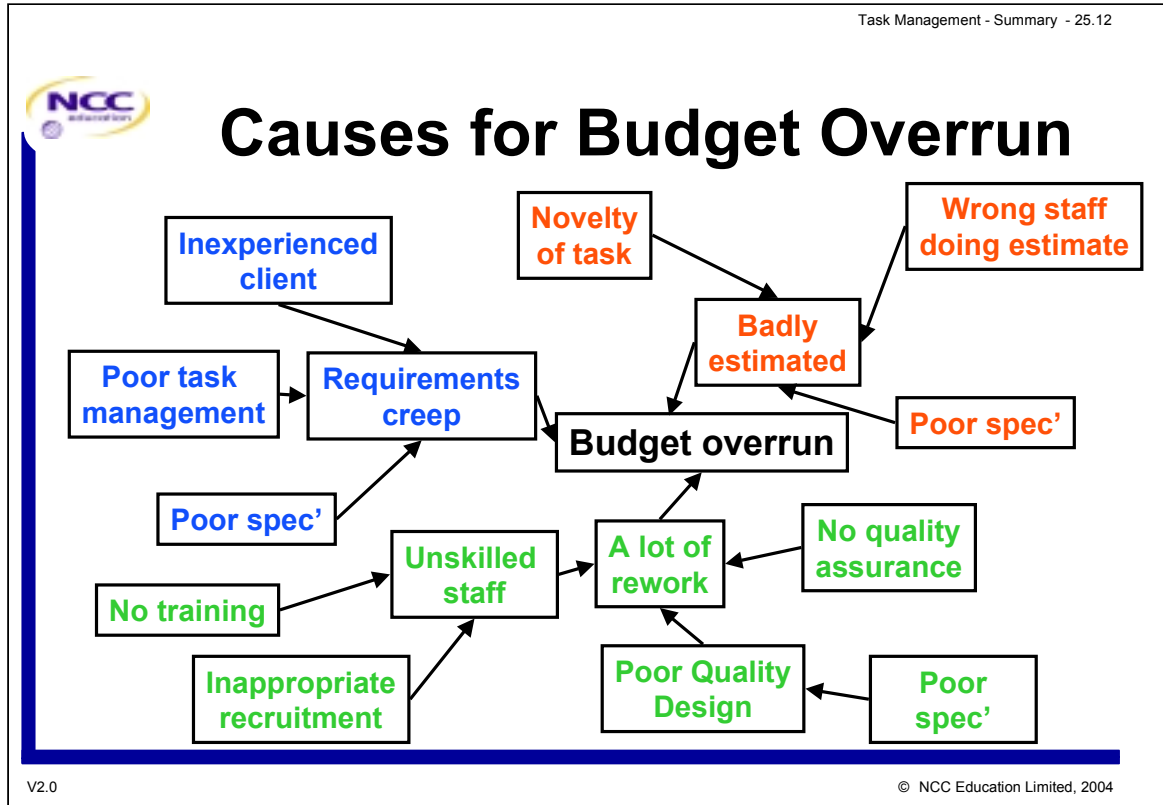
This and the following visuals form the basis of a discussion on the possible causes which could lead to failure in each dimension.

The lecturer should use these visuals to explore the possible answers to the questions posed – these could be undertaken in class or in syndicates of 3 – 5 students per syndicate. Techniques such as the mind map or the Ishikawa fish bone could be used.

- *Are there any common cause problems that have been identified in each of the dimensions?*
- *If so what could be done to prevent the problems occurring?*

An example of a mind map is shown on the next visual. The lecturer may wish to use this one as an example.

Note: The Ishikawa fish bone technique is detailed in Sarazen, J S, *The Tools of Quality, Quality Progress*, July 1990.



This is the beginning of a mind-map for budget overrun causes. It is simply drawn up by brainstorming the possible causes of failure, and then further exploring what may lead to those causes occurring.

Already it can be seen that an obvious common cause for budget overrun is a poor specification of task. If this also occurs on the other mind-maps, then it is a significant indicator that something needs to be done about it. This can be achieved by exploring the reasons why poor specifications happen, and trying to put in place preventative measures before the potential problem becomes a reality.



Timescale

- **Has the task met its timescale targets?**
- **What could cause the answer to this question to be “No”?**

See notes on previous visual.



Content

- Does the information system do what it needs to?
 - Completely?
 - Correctly?
- What could cause the answer to this question to be “No”?

See notes on previous 25-12.



Quality

- **Does the system meet its non-functional requirements?**
 - Usability
 - Modifiability
 - Understandability
 - Reliability
- **What could cause the answer to this question to be “No”?**

See notes on previous visual.

In addition, it is worth noting that quality is rarely a single entity, and first needs to be broken down into its constituent parts. The reasons for failure to meet each of these non-functional or quality requirements are likely to be very different, and it may be more appropriate to treat them separately in this exercise.



Stages of a Task

- 1. Initial enthusiasm**
- 2. Onset of reality**
- 3. Panic**
- 4. Blame of the innocent**
- 5. Reward for the uninvolved**

Finally, we conclude the module with the well published five stages of a project or task – unfortunately there is more truth in this list, than any academic text books on the subject.

The more that the students recognise that these stages are a natural phenomenon, (they will identify the symptoms at various points in their tasks and projects), the more they will be able to counteract them.

Lesson 1 - Strategic Management Process

Thinking Strategically: The Three Big Strategic Questions | What is Strategy ? | What is a Business Model ? | Strategy vs. Business Model: What is the Difference ? | Why Are Strategies Needed ? | Strategic Management Concept | The Five Tasks of Strategic Management | What is a Strategic Plan ? | Characteristics of the Strategic Management Process | Who Performs the Five Strategic Management Tasks ? | Strategic Role of a Board of Directors | Strategic Management Principle | Benefits of “Strategic Thinking” and a “Strategic Approach” to Managing

Strategic Management Processes

“Without a strategy the organization is like a ship without a rudder, going around in circles.”

Joel Ross and Michael Kami

[GOTO TOP](#)

Thinking Strategically: The Three Big Strategic Questions

1. **Where are we now?**
2. **Where do we want to go?**
 - Business(es) to be in and market positions to stake out?
 - Buyer needs and groups to serve?
 - Outcomes to achieve?
3. **How do we get there?**



[GOTO TOP](#)

What is Strategy ?



A company's strategy consists of the **set of** competitive moves and **business approaches** that management is employing to run the company

Strategy is management's “**game plan**” to ...

- Attract and please **customers**
- Stake out a **market position**
- Conduct **operations**
- Compete successfully
- Achieve organizational **objectives**



the Strategy plan looks like Discovery Ship that goes in a trip and its aim in the end is to delight the humanity whom they able to contact where ever they are

[GOTO TOP](#)

What is a Business Model ?

A company's business model addresses “**How do we make money in this business?**”

- Is the strategy that management is pursuing capable of delivering good bottom-line results?



Do the revenue-cost-profit economics of the company's strategy make good business sense?

- Look at the revenue streams the strategy is expected to produce

- Look at the associated cost structure and potential profit margins
- Do the resulting earnings streams and ROI indicate the strategy makes sense and that the company has a viable business model?

[GOTO TOP](#)

Strategy vs. Business Model: What is the Difference ?

Strategy

Deals with a company's competitive initiatives and business approaches




Business Model


Concerns whether the revenues and costs flowing from the strategy demonstrate that the business can be amply profitable and viable



Microsoft Business Model

	<p>Employ a cadre of highly skilled programmers to develop proprietary code; keep source code hidden from users.</p> <p>Sell resulting operating system and software packages to PC makers and users at relatively attractive prices and achieve large unit sales.</p> <p>Most costs arise in developing the software; variable costs are small - once break-even volume is reached, revenues from additional sales are almost pure profit.</p> <p>Provide technical support to users at no cost</p>
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Redhat Linux's Business Model

	<p>Use volunteer programmers to create the software; make source code open and available to all users</p> <p>Give Linux operating system away free of charge to those who download it (charge a small fee to users who want a copy on CD)</p> <p>Make money by employing a cadre of technical support personnel who provide technical support to users for a fee</p>
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Why Are Strategies Needed ?

To **proactively** shape how a company's business will be conducted



To mold the independent actions and decisions of managers and employees into a **coordinated, company-wide game plan**

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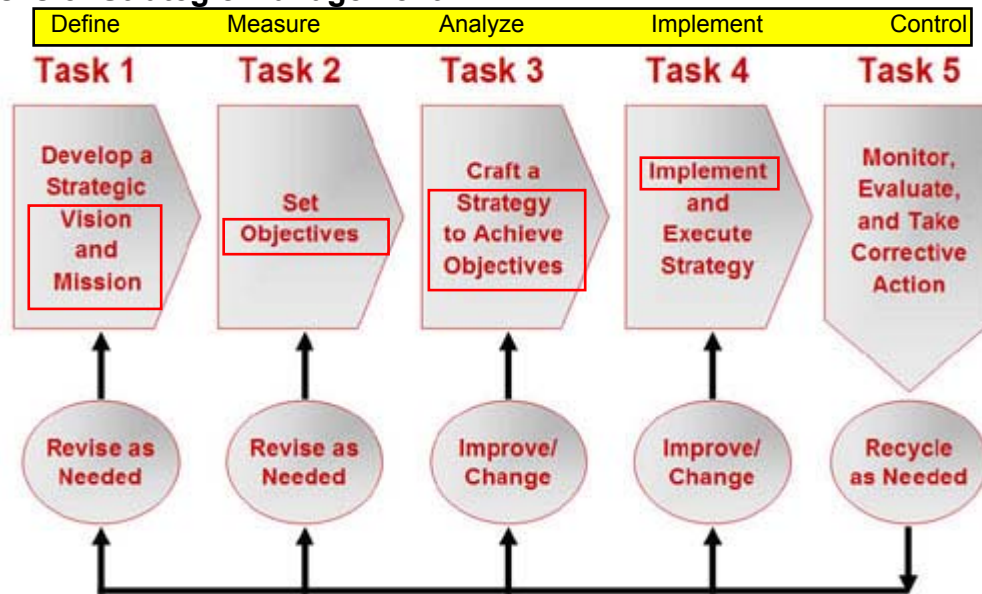
Strategic Management Concept

Competent execution of a well-conceived strategy is the **best** test of managerial excellence and a proven recipe for organizational success!

$$\text{Good Strategy} + \text{Good Strategy Execution} = \text{Good Management}$$

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The Five Tasks of Strategic Management



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Task 1: Developing a Strategic Vision

- Involves **thinking strategically** about
 - Firm's future business plans
 - Where to "go"
- Tasks include
 - Creating a **roadmap** of the future
 - Deciding **future business position** to stake out
 - Providing **long-term direction**
 - Giving firm a **strong identity**



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Characteristics of a Strategic Vision



A roadmap of a company's future ...

- Future **technology-product-customer focus**
- Geographic and product **markets** to pursue
- **Capabilities** to be developed
- Kind of **company management** is trying to create

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Missions vs. Strategic Visions

مهمة

A **mission** statement focuses on **current business activities** ...
 "who we are and what we do"

- Current product and service offerings
- Customer needs being served

رؤية

A **strategic vision** concerns a firm's **future business path** ...
 "where we are going"

- Markets to be pursued
- Future technology-product-customer focus
- Kind of company that management is

- Technological and business capabilities

trying to create

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Why is a Strategic Vision Important?



A managerial imperative exists to **look beyond today** and **think strategically** about...



- Impact of new technologies
- How customer needs and expectations are changing
- What it will take to outrun competitors
- Which promising market opportunities ought to be aggressively pursued
- External and internal factors driving what a company needs to do to prepare for the future

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Examples: Mission and Vision Statements

Microsoft		Empower people through great software anytime, anyplace, and on any device.
Intel		Our vision: Getting to a billion connected computers worldwide , millions of servers, and trillions of dollars of e-commerce. Intel's core mission is being the building block supplier to the Internet economy and spurring efforts to make the Internet more useful. Being connected is now at the center of people's computing experience. We are helping to expand the capabilities of the PC platform and the Internet.
Otis Elevator		Our mission is to provide any customer a means of moving people and things up, down, and sideways over short distances with higher reliability than any similar enterprise in the world.
Avis Rent a Car		Our business is renting cars. Our mission is total customer satisfaction.
Trader's Joe (a unique grocery store chain)		Our mission: To give our customers the best food and beverage values that they can find anywhere and to provide them with the information required for informed buying decisions. We provide these with a dedication to the highest quality of customer satisfaction delivered with a sense of warmth, friendliness, fun, individual pride, and company spirit.
3 Com		Our mission is to connect more people and organizations to information in more innovative, simple, and reliable ways than any other networking company in the world. Our vision of pervasive networking is of a world where connections are simpler , more powerful, more affordable, more global, and more available to all.
Ritz Carlton Hotels		The Ritz-Carlton Hotel is a place where the genuine care and comfort of our guests is our highest mission. We pledge to provide the finest personal service and facilities for our guests who will always enjoy a warm, relaxed yet refined ambiance. The Ritz-Carlton experiences enlivens the senses, instills well-being, and fulfills even the unexpressed wishes and needs of our guests.
Eastman Kodak		We are in the picture business.

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Task 2: Setting Objectives



- Converts **strategic vision and mission into specific performance targets**
- Creates yardsticks to track performance
- Pushes firm to be inventive and focused on results
- Helps prevent complacency and coasting

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Types of Objectives Required




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Financial Objectives

Outcomes focused on improving...
financial performance

Strategic Objectives

Outcomes focused on improving...
long-term, competitive business position

Examples of Financial Objectives		Examples of Strategic Objectives
<ul style="list-style-type: none"> • Grow earnings per share 15% annually • Boost annual return on investment (or EVA) from 15% to 20% within three years • Increase annual dividends per share to stockholders by 5% each year • Strive for stock price appreciation equal to or above the S&P 500 average • Maintain a positive cash flow every year • Achieve and maintain a AA bond rating 		<ul style="list-style-type: none"> • Increase firm's market share • Overtake key rivals on quality or customer service or product performance • Attain lower overall costs than rivals • Boost firm's reputation with customers • Attain stronger foothold in international markets • Achieve technological superiority • Become leader in new product introductions • Capture attractive growth opportunities
Example: Financial and Strategic Objectives		
Alcan Aluminum		To be the lowest-cost producer of aluminum and to outperform the average return on equity of the Standard and Poor's industrial stock index.
Atlas Corporation		To become a low-cost, medium-size gold producer, producing in excess of 125,000 ounces of gold a year and building gold reserves of 1,500,000 ounces.
3M Corporation		Annual growth in earnings per share of 10% or better, on average; A return on stockholders' equity of 20-25%; A return on capital employed of 27% or better; and Have at least 30% of sales come from products introduced in the past four years.

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Task 3: Crafting a Strategy

- Strategy involves determining whether to
 - Concentrate on a **single business or several businesses** (diversification)
 - Cater to a broad range of customers or focus on a particular niche
 - Develop **a wide or narrow product** line
 - Pursue a competitive advantage based on
 - Low cost or
 - Product superiority or
 - Unique organizational capabilities
- Involves deciding how to
 - Respond to changing buyer preferences
 - Respond to new market conditions

- Grow the business over the long-term
- Achieve performance targets
- Outcompete rivals



A Company's Strategy is Partly **Planned** and **Partly** Reactive



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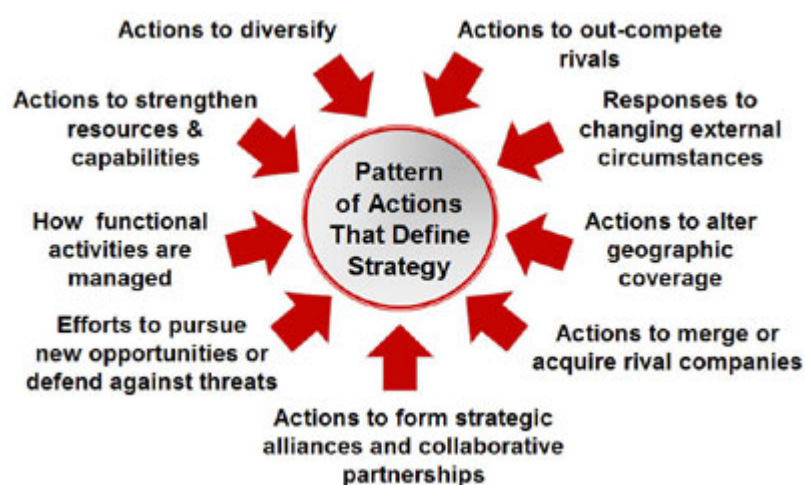
The Hows That Define a Firm's Strategy

- How to grow the business
- How to please customers
- How to outcompete rivals
- How to respond to changing market conditions
- How to manage each functional piece of the business and develop needed organizational capabilities
- How to achieve strategic and financial objectives



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Understanding a Company's Strategy -- What to Look For ...



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Example of a Company's Strategy

Strategic Priorities of McDonald's	Core Elements of McDonald's Strategy
	<ul style="list-style-type: none"> • Add 1750 restaurants annually



- Continued growth
- Providing exceptional customer care
- Remaining an efficient and quality producer
- Developing people at every organizational level
- Sharing best practices among all units
- Reinventing the fast food concept by fostering innovation in the menu, facilities, marketing, operation, and technology

- Promote frequent customer visits via attractive menu items, low-price specials, and Extra Value Meals
- Be highly selective in granting franchises
- Locate on sites offering convenience to customers and profitable growth potential
- Focus on limited menu and consistent quality
- Careful attention to store efficiency
- Extensive advertising and use of Mc prefix
- Hire courteous personnel; pay an equitable wage; provide good training

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Crafting Strategy is an Exercise in Entrepreneurship

Strategy-making is a market-driven and customer-driven activity that involves:

- Keen eye for spotting emerging market opportunities
- Keen observation of customer needs
- Innovation and creativity
- Prudent risk-taking
- Strong sense of how to grow and strengthen business



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Characteristics of Managers with Good Entrepreneurial Skills



- Boldly pursue new strategic opportunities
- Emphasize out-innovating the competition
- Lead the way to improve firm performance
- Willing to be a first-mover and take risks
- Respond quickly and opportunistically to new developments
- Devise trail blazing strategies

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Why Do Strategies Evolve?

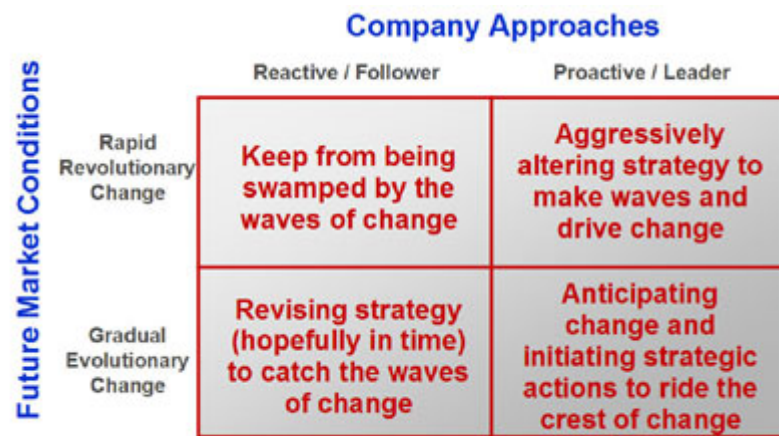
There is always an ongoing need to react to:

- Shifting market conditions
- Fresh moves of competitors
- New technologies
- Evolving customer preferences
- Political and regulatory changes
- New windows of opportunity
- Crisis situations



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Strategic Approaches to Preparing for Future Market Conditions



Source: Adapted from Derek F. Abell, "Competing Today While Preparing for Tomorrow," Sloan Management Review 40, No. 3 (Spring 1998), p. 75.

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What is a Strategic Plan ?



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Task 4: Implementing and Executing Strategy

- Taking actions to put a freshly-chosen strategy into place
- Supervising the ongoing pursuit of strategy
- Improving the competence and efficiency with which the strategy is being executed
- Showing measurable progress in achieving the targeted results and objectives



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Strategy Implementation and Execution

Strategy **implementation** and **execution** is an action-oriented, "make-it-happen" process involving people management, developing competencies and capabilities, budgeting, policy-making, motivating, culture-building, and leadership

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What Does Strategy Implementation and Execution Include?

- Building a capable organization
- Allocating resources to strategy-critical activities
- Establishing strategy-supportive policies
- Motivating people to pursue the target objectives
- Tying rewards to achievement of results
- Creating a strategy-supportive corporate culture

- Installing needed information, communication, and operating systems
- Instituting best practices and programs for continuous improvement
- Exerting the leadership necessary to drive the process forward and keep improving



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Task 5: Monitoring, Evaluating, and Taking Corrective Actions as Needed

The *tasks* of crafting, implementing, and executing a strategy are *not* a one-time exercise



- Customer needs and competitive conditions change
- New opportunities appear; technology advances; any number of other outside developments occur
- One or more aspects of executing the strategy may not be going well
- New managers with different ideas take over
- Organizational learning occurs

All these trigger the need for corrective actions and adjustments

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Characteristics of the Strategic Management Process

- Need to do the five tasks **never** goes away
- Boundaries among the five tasks are blurry
- Strategizing is not isolated from other managerial activities
- Time required comes in lumps and spurts
- **The big challenge:** To get the best strategy-supportive performance from employees, perfect current strategy, and improve strategy execution



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Who Performs the Five Strategic Management Tasks ?




- Senior Corporate Executives
- Managers of Subsidiary Business Units
- Functional Area Managers
- Operating Managers



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Approaches to Performing the Strategy-Making Task

Chief Architect	Manager personally functions as chief strategist	
Delegate-It-to-Down-the-Line Managers	Manager delegates some strategy-making responsibility to subordinates in charge of key organizational units	
Collaborative/Team	Manager enlists assistance and advice of key subordinates in hammering out a consensus strategy	
Corporate Intrapreneur	Manager encourages subordinates to develop and champion proposals for new ventures	

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Strategic Role of a Board of Directors



- Critically appraise and ultimately approve strategic action plans
- Evaluate strategic leadership skills of the CEO and candidates to succeed the CEO

Strategic Management Principle

A **board of director's** role in the strategic management process is to critically appraise and ultimately approve strategic action plans and to evaluate the strategic leadership skills of the CEO and others in line to succeed the incumbent CEO.

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Benefits of “Strategic Thinking” and a “Strategic Approach” to Managing



Guides entire firm regarding “what it is we are trying to do and to achieve”

Makes managers more alert to “winds of change, new opportunities, and threatening developments

Unifies numerous strategy-related decisions and organizational efforts
Creates a proactive atmosphere

Promotes development of an evolving business model focused on bottom-line success

Provides basis for evaluating competing budget requests

HELPS A COMPANY PREPARE FOR THE FUTURE

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Lesson 2 - The Three Strategy-Making Tasks

1st Direction-Setting Task: Developing a Strategic Vision | Three Elements of a Strategic Vision | Characteristics of Mission Statement | Characteristics of a Strategic Vision | Communicating the Vision | 2nd Direction-Setting Task: Establishing Objectives | Purpose of Objective-Setting | Concept of Strategic Intent | 3rd Direction-Setting Task: Crafting a Strategy | Characteristics of Strategy-Making | Tasks of Corporate Strategy | Factors Shaping the Choice of Company Strategy | Company Opportunities and Threats | Ambitions, Philosophies, and Ethics of Key Executives | Tests of a Winning Strategy

The Three Strategy-Making Tasks

“Management’s job is not to see the company as it is....
but as it can become.”

John W. Teets

“A strategy is ...
a commitment to undertake one set of actions rather than another.”

Sharon M. Oster

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1st Direction-Setting Task: Developing a Strategic Vision

Entails management efforts to create a **future-oriented** roadmap for a company that spells out “where we are headed”...

- Buyer needs we are moving to satisfy
- Buyer groups and markets we are going to target
- Kind of company we are trying to become



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Strategic Management Principle

Effective strategy-making begins with a vision of where the organization needs to head !

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Examples of Strategic Visions

John Deere’s Strategic Vision	
	<div>Who Are We?</div> <p>John Deere has grown and prospered through a long-standing partnership with the world’s most productive farmers. Today, John Deere is a global company with several equipment operations and complementary service businesses. These businesses are closely interrelated, providing the company with significant growth opportunities and other synergistic benefits.</p>
<div>Where Are We Going?</div>	

Deere is committed to providing genuine value to the company's stakeholders. In support of that commitment, Deere aspires to:

- Grow and pursue leadership positions in each of our businesses.
- Extend our preeminent leadership position in the agricultural equipment market worldwide.
- Create new opportunities to leverage the John Deere brand globally.

How Will We Get There?

By pursuing the broader corporate goals of profitable growth and continuous improvement, each of the company's businesses is expected to:

- Achieve world-class performance by attaining a strong competitive position in target markets.
- Exceed customer expectations for quality and value.
- Earn in excess of the cost of capital over a business cycle.

By growing profitably and continuously improving, each of the company's businesses will benefit from and contribute to Deere's unique intangible assets:


- Our distinguished brand.
- Our heritage of integrity and teamwork.
- Our advanced skills.
- The special relationships that have long existed between the company and our employees, customers, dealers and other business partners around the world.

How Will We Measure Our Performance?

Each business will make a positive contribution to the corporation's objectives in the pursuit of creating genuine value for our stakeholders. Our "scorecard" includes:

- Human Resources--employee satisfaction, training
- Customer Focus--loyalty, market leadership
- Business Processes--productivity, quality, cost, environment
- Business Results--return on assets, sales growth

Delta Airline's Strategic Vision

	<p>..... we want Delta to be the WORLDWIDE AIRLINE OF CHOICE.</p> <p>WORLDWIDE, because we are and intend to remain an innovative, aggressive, ethical, and successful competitor that offers access to the world at the highest standards of customer service. We will continue to look for opportunities to extend our reach through new routes and creative global alliances.</p> <p>AIRLINE, because we intend to stay in the business we know best -- air transportation and related services. We won't stray from our roots. We believe in the long-term prospects for profitable growth in the airline industry, and we will continue to focus time, attention, and investment on enhancing our place in that business environment.</p> <p>OF CHOICE, because we value the loyalty of our customers, employees, and investors. For passengers and shippers, we will continue to provide the best service and value. For our personnel, we will continue to offer an ever more challenging, rewarding, and result-oriented workplace that recognizes and appreciates their contributions. For our shareholders, we will earn a consistent, superior financial return.</p>
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Three Elements of a Strategic Vision

Use the mission statement as a starting point
Develop a strategic vision that spells out a course to pursue

Characteristics of a Mission Statement

- Defines **current** business activities
- Highlights **boundaries** of current business
- Conveys
 - **Who** we are,
 - **What** we do, and
 - **Where** we are now
- Company **specific**, not generic — so as to give a company its own identity



A company's mission is not to make a profit !

The real mission is always - ***“What will we do to make a profit?”***


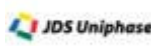

Defining a Company's Business



A good **business definition** incorporates three factors...

- **Customer needs** - **What** is being satisfied
- **Customer groups** - **Who** is being satisfied
- **Technologies and competencies employed** - **How** value is delivered to customers to satisfy their needs

Examples of Business Mission

Cardinal Health		<ul style="list-style-type: none"> • Cardinal Health is a leading provider of services supporting health care worldwide. • The company offers a broad array of services for health-care providers and manufacturers to help them improve the efficiency and quality of health care. • These services include pharmaceutical distribution, health-care product manufacturing and distribution, drug delivery systems development, . . . , retail pharmacy franchising, and health-care information systems development.
JDS Uniphase		<ul style="list-style-type: none"> • JDS Uniphase is the leading provider of advanced fiber optic components and modules. • These products are sold to the world's leading telecommunications and cable television system providers . . . • Our products perform both optical-only functions and optoelectronic functions within fiber optic networks. • Our products include semiconductor lasers, . . . , and isolators for fiber optic applications. • In addition, we design, manufacture, and market laser subsystems for a broad range of OEM applications, which include . . .
Russell Corporation		<ul style="list-style-type: none"> • Russell Corporation is a vertically integrated international designer, manufacturer, and marketer of athletic uniforms, . . . , and a comprehensive line of lightweight, yarn-dyed woven fabrics. • The Company's manufacturing operations include the entire process of converting raw fibers into finished apparel and fabrics. • Products are marketed to sporting goods dealers, department and specialty stores, mass merchandisers, . . . , and other apparel manufacturers.

Broad or Narrow Mission Statements?

Narrow enough to specify **real arena** of interest

Serve as ...

- **Boundary** for what to do and not do
- **Beacon** of where top management intends to take firm



Diversified companies have **broader** business definitions than single-business enterprises

Broad vs. Narrow Scope


Broad Definition	Narrow Definition
<ul style="list-style-type: none"> • Furniture • Telecommunications • Beverages • Global mail delivery • Travel & tourism 	<ul style="list-style-type: none"> • Wrought-iron lawn furniture • Long-distance telephone service • Soft drinks • Overnight package delivery • Caribbean cruises






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Examples of Business Missions

The McGraw Hill Companies (a diversified firm)		<ul style="list-style-type: none"> • The McGraw-Hill Companies is a global publishing, financial, information and media services company with such renowned brands as Standard & Poor's, Business Week, and McGraw-Hill educational and professional materials. • The Company provides information via various media platforms: books, magazines and newsletters; on-line; via television, satellite and FM sideband broadcast; and software, videotape, facsimile and CD-ROM products. • The Company now creates more than 90 % of its information on digital platforms and its business units are represented on more than 75 Web sites.
FDX Corporation (a diversified firm)		<ul style="list-style-type: none"> • FDX is composed of a powerful family of companies: FedEx, RPS, Viking Freight, FDX Global Logistics and Roberts Express. • These companies offer logistics and distribution solutions on a regional, national and global scale: fast, reliable, time-definite express delivery; . . . expedited same-day delivery; . . . ; and integrated information and logistics solutions • With all this expertise under one umbrella, the FDX companies can provide businesses with the competitive advantage they need by providing streamlined solutions that are on the cutting edge of technology.

Examples of Mission Statements

Pfizer Inc.		<p>Pfizer is a research-based, global pharmaceutical company. We discover and develop innovative, value-added products that improve the quality of life of people around the world and help them enjoy longer, healthier, and more productive lives.</p> <p>The company has three business segments: health care, animal health and consumer health care. Our products are available in more than 150 countries.</p>
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Ritz-Carlton Hotel		<p>The Ritz-Carlton Hotel is a place where the genuine care and comfort of our guests is our highest mission.</p> <p>We pledge to provide the finest personal service and facilities for our guests who will always enjoy a warm, relaxed yet refined ambiance.</p> <p>The Ritz-Carlton experiences enlivens the senses, instills well-being, and fulfills even the unexpressed wishes and needs of our guests.</p>
Apple Computer, Inc.		<p>Apple Computer, Inc., ignited the personal computer revolution in the 1970s with the Apple II, and reinvented the personal computer in the 1980s with the Macintosh.</p> <p>Apple is now committed to its original mission--to bring the best personal computing products and support to students, educators, designers, scientists, engineers, business persons and consumers in over 140 countries around the world.</p>
The Gillette Company		<p>The Gillette Company is a globally focused consumer products company that seeks competitive advantage in quality, value-added personal care and personal use products. We compete in four large, worldwide businesses: personal grooming products, consumer portable power products, stationery products and small electrical appliances.</p> <p>As a company, we share skills and resources among business units to optimize performance. We are committed to a plan of sustained sales and profit growth that recognizes and balances both short- and long-term objectives.</p> <p>Our mission is to achieve or enhance clear leadership, worldwide, in the existing or new core consumer product categories in which we choose to compete. Current core categories are:</p> <ul style="list-style-type: none"> • Male grooming products - blades and razors, electric shavers, shaving preparations and deodorants . . . • Female grooming products - wet shaving products, hair removal and hair care appliances and deodorants . . . • Alkaline and specialty batteries and cells. • Writing instruments and correction products. • Certain areas of the oral care market - toothbrushes . . . • Selected areas of the high-quality small household appliance business - coffeemakers . . .
Dubai Internet City		<p>The mission of Dubai Internet City is to create an infrastructure, environment and attitude that will enable Information and Communications Technology (ICT) enterprises to operate locally, regionally and globally, from Dubai , with significant competitive advantage.</p> <p>“The ‘attitude’ dimension in our mission is vitally important. It means approaching our customers and business partners with a view to solving their problems.”</p>
Dubai eGovernment		<p>Dubai eGovernment was established with a mission to ease the life of the community and businesses interacting with the government and contribute in establishing Dubai as a leading hub in the New Economy.</p>

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Mission Statements for Functional Departments

Spotlights department's...

- **Role** and **scope of activities**
- **Direction** which department needs to pursue
- **Contribution** to firm's overall mission



Examples of Mission Statements of Functional Departments

Human Resources	To contribute to organizational success by developing effective leaders, creating high performance teams, and maximizing the potential of individuals.
Corporate Security	To provide services for the protection of corporate personnel and assets through preventive measures and investigations.
Real Estate Department (Dubai)	The mission of the Real Estate Department involves the following three criteria: to participate in Dubai's development and prosperity, to encourage the citizens of Dubai to invest in profitable projects by leasing lands with symbolic prices, and to offer accommodation for both UAE nationals and expatriates at reasonable prices.
Department of Health and Medical Services (Dubai)	The Department of Health & Medical Services is the responsible Health Authority in the Emirate of Dubai. It aims to provide, to international standards, preventive, curative and primitive health services to the community by utilizing the best technology and human resources.

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Characteristics of a Strategic Vision



- Charts a company's future strategic course
- Defines the business makeup for 5 years (or more)
- Specifies future technology-product-customer focus
- Indicates capabilities to be developed
- Requires managers to exercise foresight

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Questions to Address in Developing a Strategic Vision

1. What changes are occurring in the market arena(s) where we operate and what implications do these changes have for our future direction?
2. What new or different customer needs should we be moving to satisfy?
3. What new or different buyer segments should we be concentrating on?
4. What new geographic or product markets should we be pursuing?
5. What should the company's business makeup look like in 5 years?
6. What kind of company should we be trying to become?


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Entrepreneurial Challenges in Forming a Strategic Vision

- How to creatively prepare a company for the future
- How to keep the company responsive to...
 - Evolving customer needs
 - Competitive pressures
 - New technologies
 - New market opportunities
 - Growing or shrinking opportunities



Intel's "Strategic Inflection Points"

	Prior to mid-1980s
	<ul style="list-style-type: none"> • Focus on memory chips
	Starting in mid-1980s
	<ul style="list-style-type: none"> • Abandon memory chip business and <ul style="list-style-type: none"> ◦ Become preeminent supplier of microprocessors to PC industry ◦ Make PC central appliance in workplace and home ◦ Be undisputed leader in driving PC technology forward

1998

- Shift focus from PC technology to becoming the pre-eminent building block supplier to the Internet economy

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Communicating the Vision

An exciting, inspirational vision...

- Challenges and motivates workforce
- Arouses strong sense of organizational purpose
- Induces employee buy-in
- Galvanizes people to live the business



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Managerial Value of a Well-Conceived Strategic Vision and Mission

- Crystallizes long-term direction
- Reduces risk of rudderless decision-making
- Conveys organizational purpose and identity
- Keeps direction-related actions of lower-level managers on common path
- Helps organization prepare for the future



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2nd Direction-Setting Task: Establishing Objectives



- Represent commitment to achieve *specific performance targets* by a certain time
- Should be stated in *quantifiable* terms and contain a *deadline* for achievement
- Spell-out *how much* of *what kind* of performance *by when*

Purpose of Objective-Setting

- Substitutes results-oriented decision-making for aimlessness over what to accomplish
- Provides a set of benchmarks for judging organizational performance

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Strategic Management Principle

Every company needs **both** strategic and financial objectives!

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Two Types of Objectives Are Required

Financial Objectives

Outcomes that improve a firm's financial performance

Strategic Objectives

Outcomes that strengthen a firm's competitiveness and long-term market position

Examples of Financial Objectives







- Achieve revenue growth of 10% /year
- Increase earnings by 15% annually
- Increase dividends / share by 5% /year
- Increase net profit margins from 2%-4%
- Attractive EVA performance
- Stronger bond and credit ratings
- A rising stock price (outperform S&P 500)
- Attractive increases in MVA
- Recognition as a “blue chip” company
- A more diversified revenue base

Examples of Strategic Objectives

- A bigger market share
- Quicker design-to-market times than rivals
- Higher product quality than rivals
- Lower costs relative to key competitors
- Broader product line than rivals
- Better e-commerce and Internet sales capabilities than rivals
- Better customer service than rivals
- Recognition as a leader in technology
- Wider geographic coverage than rivals

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Examples: Corporate Objectives

Citigroup (strategic objective)		To attain one billion customers worldwide.
McDonald's (strategic objective)		To achieve 100 percent total customer satisfaction ... everyday ... in every restaurant ... for every customer.
General Electric (strategic objectives)		<ul style="list-style-type: none"> • Become the most competitive enterprise in the world. • Be number one or number two in each business we are in. • Globalize every activity in the company. • Embrace the Internet and become a global e-business.
Anheuser-Busch (strategic & financial objectives)		<ul style="list-style-type: none"> • To make all our companies leaders in their industries in quality while exceeding customer expectations. • To achieve a 50% share of the U.S. beer market. • To establish and maintain a dominant leadership position in the international beer market. • To provide all our employees with challenging and rewarding work, . . . , and opportunities for personal development, advancement, and competitive compensation. • To provide our shareholders with superior returns by achieving double-digit annual earnings per share growth, . . .
McCormick & Company (financial objectives)		<ul style="list-style-type: none"> • To achieve a 20% return on equity. • To achieve a net sales growth rate of 10% per year. • To maintain an average earnings per share growth rate of 15% per year. • To maintain total debt-to-total capital at 40% or less. • To pay out 25% to 35% of net income in dividends. • To make selective acquisitions which complement our current businesses and can enhance our overall returns. • To dispose of those parts of our businesses which do not or cannot generate adequate returns or do not fit with our business strategy.
Motorola (financial objectives)		<ul style="list-style-type: none"> • Self-funding revenue growth of 15% annually. • An average return on assets of 13 to 15%. • An average return on shareholders' equity investment of 16 to 18%. • A strong balance sheet.

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Strategic or Financial Objectives - Which Take Precedence?

Pressures for better **short-term financial performance** become pronounced when...

- Firm is struggling financially
- Resource commitments for new strategic initiatives may hurt bottom-line for several years

- Proposed strategic moves are risky

Otherwise strategic objectives merit top priority - a firm that consistently passes up opportunities to strengthen its **long-term competitive position**

- Risks diluting its competitiveness
- Risks losing momentum in its markets
- Hurts its ability to fend off rivals' challenges



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Strategic Management Principle

Building a stronger long-term competitive position
benefits shareholders more lastingly than improving short-term profitability!

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Concept of Strategic Intent

A company exhibits *strategic intent* when it *relentlessly* pursues an ambitious strategic objective and concentrates its competitive actions and energies on achieving that objective!

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Characteristics of Strategic Intent



- Indicates firm's intent to *stake out* a particular position over the *long-term*
- Involves establishing a **BHAG** - "big, hairy, audacious goal"
- Signals relentless *commitment* to winning

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Short-Range Versus Long-Range Objectives

Short-Range objectives...

- Targets to be achieved *soon*
- Serve as *stair steps* for reaching long-range performance

Long-Range objectives...

- Targets to be achieved within *3 to 5 years*
- Prompt actions *now* that will permit reaching targeted long-range performance *later*



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Objectives Are Needed at All Levels

Objective-setting process is *top-down*, not *bottom-up* !

1. First, establish *organization-wide* objectives and performance targets
2. Next, set *business* and *product line* objectives
3. Then, establish *functional* and *departmental* objectives



4. Individual *objectives* are established last

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Strategic Management Principle

Objective-setting needs to be more of a **top-down** than a bottom-up process in order to guide lower-level managers and organizational units toward outcomes that support the achievement of overall business and company objectives.

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3rd Direction-Setting Task: Crafting a Strategy

An organization's *strategy* deals with...



- How to make the strategic vision a reality and achieve target objectives
- The *game plan* for
 - Pleasing customers
 - Conducting operations
 - Building a sustainable competitive advantage

Strategy constitutes management's *business model* for producing good profitability

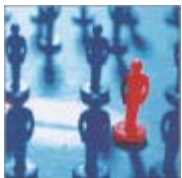
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Strategizing Involves **HOW** To . . .

- Achieve performance targets
- Out-compete rivals and achieve a sustainable competitive advantage
- Respond to changing market conditions and new customer requirements
- Make the strategic vision a reality



Characteristics of Strategy-Making



- Strategy is action-oriented
- Strategy evolves over time
- Strategy-making is a never-ending, ongoing task

Rule-Breaking Strategies

Challenge fundamental conventions by...

- Reconceiving a product or service
 - Creating a single-use disposable camera
- Redefining the marketplace
 - Detouring retailers by selling online at the company's website

- Redrawing industry boundaries
 - Getting credit cards from Shell Oil or General Motors or AOL



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Levels of Strategy-Making in a Diversified Company



Levels of Strategy-Making in a Single-Business Company



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Corporate Strategy for a Diversified Company



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Tasks of Corporate Strategy



- Moves to achieve **diversification**
- Actions to **boost performance** of individual businesses
- Capturing valuable cross-business **strategic fits** that result in $1 + 1 = 3$ effects!
- Establishing **investment priorities** and steering corporate resources into the most attractive businesses

Identifying the Components of a Single-Business Company's Strategy



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What Business Strategy Involves

- Forming **responses** to changes in industry and competitive conditions, buyer needs and preferences, economy, regulations, etc.
- Crafting **competitive moves** to produce sustainable competitive advantage
- Building competitively valuable **competencies** and **capabilities**
- **Uniting** strategic initiatives of functional areas
- Addressing **strategic issues** facing the company



Functional Strategies



- **Game plan** for a strategically-relevant function, activity, or business process
- Details **how** key activities will be managed
- Provide **support** for business strategy
- Specify **how** functional objectives are to be achieved

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Operating Strategies



- Concern narrower strategies for managing grassroots activities and strategically-relevant operating units
- Add detail to business and functional strategies

Example: Operating Strategy

Improving Delivery & Order-Filling

Manufacturer of plumbing equipment emphasizes quick delivery and accurate order-filling as keystones of its customer service approach. Warehouse manager took following approaches:

- Inventory stocking strategy allowing 99% of all orders to be completely filled without backordering any item
- Staffing strategy of maintaining workforce capability to ship any order within 24 hours

Boosting Worker Productivity

To boost productivity by 10%, managers of firm with low-price, high-volume strategy take following actions:

- Recruitment manager develops selection process designed to weed out all but best-qualified candidates
- Information systems manager devises way to use technology to boost productivity of office workers
- Compensation manager devises improved incentive compensation plan
- Purchasing manager obtains new efficiency-increasing tools and equipment

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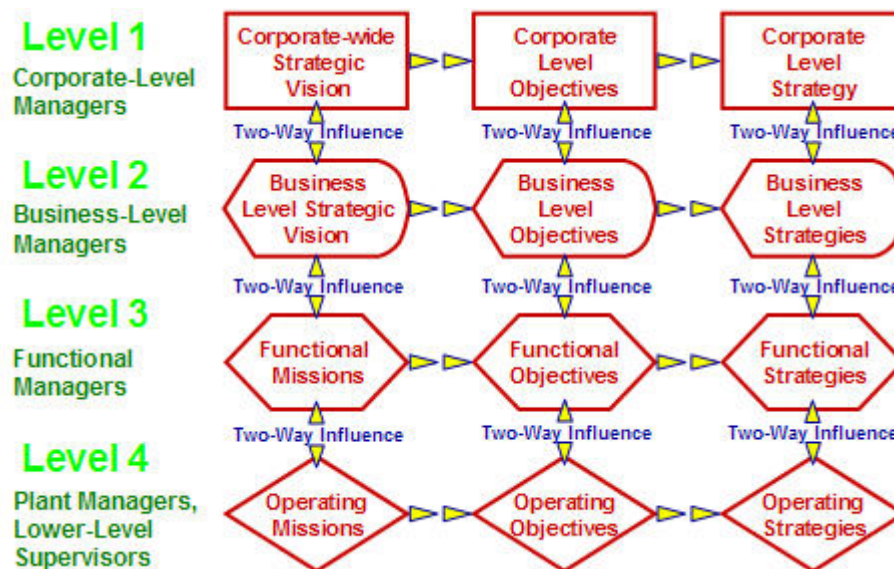
Uniting the Company's Strategy-Making Effort

- A company's strategy is a **collection** of strategies and initiatives being acted on by managers at various organizational levels
- Separate levels of strategy must be unified into a **cohesive**, company-wide action plan
- Pieces of strategy should **fit** together like the pieces of a **puzzle**



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Networking of Missions, Objectives, and Strategies



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Strategic Management Principle

Objectives and strategies that are unified from top to bottom of the strategy-making managerial hierarchy require a **team effort** !

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Factors Shaping the Choice of Company Strategy



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Social, Political, Regulatory, and Community Factors



- Pressures from special interest groups
- Glare of investigative reporting
- Health and nutrition concerns
- Concerns about alcohol and drug abuse
- Sexual harassment
- Corporate downsizing
- Impact of plant closings on communities
- Rising/falling interest rates

- Economic conditions (good or bad)
- Trade restrictions, tariffs, and import quotas

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What Do We Mean by “Corporate Social Responsibility?”

- Conducting company activities within bounds of what is considered **ethical** and in public interest
- Responding positively to emerging societal priorities and expectations
- Demonstrating willingness to take needed action ahead of regulatory confrontation
- Balancing stockholder interests against larger interest of society as a whole
- Being a “**good citizen**” in community



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Competitive Conditions and Industry Attractiveness



A company’s strategy has to be **responsive** to ...

- Fresh moves of rival competitors
- Changes in industry’s price-cost-profit economics
- Shifting buyer needs and expectations
- New technological developments
- Pace of market growth

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Strategic Management Principle

A company’s strategy can’t produce real market success unless it is **well-matched** to industry and competitive conditions!

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Company Opportunities and Threats

For strategy to be successful, it has to

- Be well matched to capturing a company’s best **opportunities**
- And help counteract **threats** to the company’s well-being



Company Strengths, Competencies, and Competitive Capabilities



- A company must have or be able to acquire the resources, competencies, and competitive capabilities needed to **execute the chosen strategy**
- Resource deficiencies, gaps in skills, and weaknesses in competitive position make **pursuit of certain strategies risky** or altogether unwise

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Strategic Management Principle

A company's strategy ought to be grounded in its resource strengths and in what it is good at doing (its competencies and competitive capabilities); it is perilous to discount the competitive liabilities of company's resource deficiencies and skills gaps !

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Ambitions, Philosophies, and Ethics of Key Executives

Managers generally stamp strategies they craft with their own **personal**...

- Ambitions
- Values
- Business philosophies
- Attitudes toward risk
- Ethical beliefs



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Shared Values and Company Culture

Values and culture often shape the strategic moves a company will...



- Consider
- Reject

It is generally unwise for a company to undertake strategic moves which conflict with...

- Its culture
- Values widely shared by managers and employees

Hewlett-Packard's Basic Values: "The HP Way"



- Sharing firm's success with employees
- Showing trust and respect for employees
- Providing customers with products or services of the greatest value
- Being genuinely interested in providing customers with effective solutions to their problems
- Making profit a high stockholder priority
- Avoiding use of long-term debt to finance growth
- Individual initiative, creativity, & teamwork
- Being a good corporate citizen

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Linking Strategy With Ethics

Ethical and moral standards go beyond



- Prohibitions of law and
- Language of "thou shalt not"

Ethical and moral standards involve

- **Issues** of duty and
- Language of "should and should not do"



A Firm's Ethical Responsibilities to Its Stakeholders

Owners / shareholders	Rightfully expect some form of return on their investment
Employees	Rightfully expect respect for their worth and devoting their energies to firm
Customers	Rightfully expect a seller to provide them with a reliable, safe product or service
Suppliers	Rightfully expect to have an equitable relationship with firms they supply
Community	Rightfully expect businesses to be good citizens in their community

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Tests of a Winning Strategy

	<p>GOODNESS OF FIT TEST</p> <ul style="list-style-type: none"> • How well is strategy matched to firm's situation? <p>COMPETITIVE ADVANTAGE TEST</p> <ul style="list-style-type: none"> • Does strategy lead to sustainable competitive advantage? <p>PERFORMANCE TEST</p> <ul style="list-style-type: none"> • Does strategy boost firm performance?
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Strategic Management Principle

<p>To be a real winner, a strategy must ...</p> <ol style="list-style-type: none"> 1. Fit the enterprise's internal and external situation 2. Build sustainable competitive advantage 3. Improve company performance

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Lesson 3 - Industry and Competitive Analysis

What is Situation Analysis ? | Question 1: What are the Industry's Dominant Economic Traits? | Question 2: What Is Competition Like and How Strong Are the Competitive Forces? | Question 3: What Forces Are at Work to Change Industry Conditions? | Question 4: Which Companies are in Strongest / Weakest Positions? | Question 5: What Strategic Moves Are Rivals Likely to Make Next? | Question 6: What are the Key Factors for Competitive Success? | Question 7: Is the Industry Attractive or Unattractive and Why? |

"Analysis is the critical starting point of strategic thinking."

Kenichi Ohma

"Things are always different -
the art is figuring out which differences matter."

Laszlo Birinyi

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What Is Situation Analysis?

Two considerations:

- Company's **external** or **macro**-environment
 - Industry and competitive conditions
- Company's **internal** or **micro**-environment
 - Competencies, capabilities, resource strengths and weaknesses, and competitiveness



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The Components of a Company's Macro-Environment



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Strategic Thinking and Analysis Leads to Good Strategic Choices



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Key Considerations Regarding the Industry and Competitive Environment



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Question 1: What are the Industry's Dominant Economic Traits?

- Market size and growth rate
- Scope of competitive rivalry
- Number of competitors and their relative sizes
- Prevalence of backward/forward integration
- Entry/exit barriers
- Nature and pace of technological change
- Product and customer characteristics
- Scale economies and experience curve effects
- Capacity utilization and resource requirements
- Industry profitability



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The Experience Curve Effect

An **experience curve** exists when a company's unit costs decline as its **cumulative** production volume increases because of ...

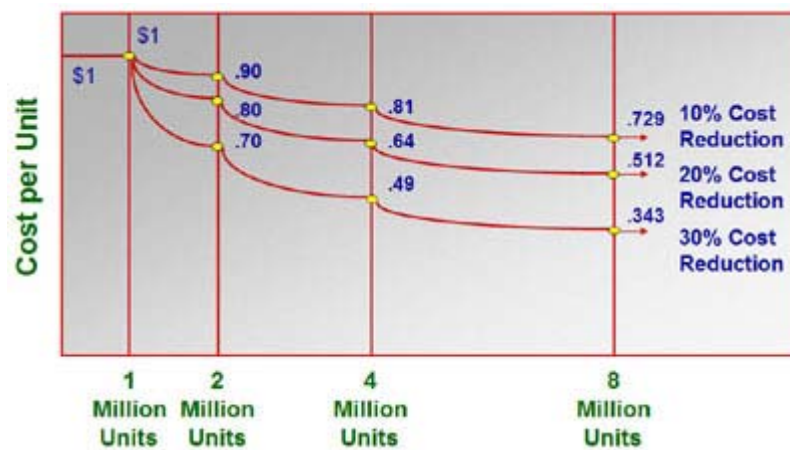


- Accumulating **production know-how**
- **Growing mastery of the technology**

The bigger the **experience curve** effect, the bigger the cost advantage of the firm with the largest **cumulative** production volume

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Cost Advantages of Different Experience Curve Effects



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Relevance of Key Economic Features

Economic Feature	Strategic Importance
Market Size	Small markets don't tend to attract new firms; large markets attract firms looking to acquire rivals with established positions in attractive industries
Market growth rate	Fast growth breeds new entry; slow growth spawns increased rivalry & shake-out of weak rivals
Capacity surpluses/shortages	Surpluses push prices & profit margins down; shortages pull them up
Industry profitability	High-profit industries attract new entrants; depressed conditions lead to exit
Entry/exit barriers	High barriers protect positions and profits of existing firms; low barriers make existing firms vulnerable to entry
Product is big-ticket item for buyers	More buyers will shop for lowest price
Standard products	Buyers have more power because it's easier to switch from seller to seller
Rapid technological change	Raises risk; investments in technology facilities/equipment may become obsolete before they wear out
Capital requirements	Big requirements make investment decisions critical; timing becomes important; creates a barrier to entry and exit
Vertical integration	Raises capital requirements; often creates competitive & cost differences among fully vs. partially vs. non-integrated firms
Economies of scale	Increases volume & market share needed to be cost competitive
Rapid product innovation	Shortens product life cycle; increases risk because of opportunities for leapfrogging

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Question 2: What Is Competition Like and How Strong Are the Competitive Forces?

- To identify
 - o Main sources of competitive forces
 - o Strength of these forces
- Key analytical tool
 - o Five Forces Model of Competition



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Five Forces Model of Competition



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Analyzing the Five Competitive Forces: How to Do It



- Assess **strength** of each of the five competitive forces (Strong? Moderate? Weak?)
 - Rivalry among competitors
 - Competition from substitute products
 - Competitive threat from potential entrants
 - Bargaining power of suppliers and supplier-seller collaboration
 - Bargaining power of buyers and buyer-seller collaboration
- Explain how **each** force acts to create competitive pressure - **What are the factors that cause each force to be strong or weak?**
- Decide whether **overall competition** (the combined effect of all five competitive forces) is brutal, fierce, strong, normal/moderate, or weak

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Rivalry Among Competing Sellers

- Usually the **most powerful** of the five forces
- The big factor determining the strength of rivalry is how actively and aggressively are rivals employing the various weapons of competition in jockeying for a stronger market position and seeking bigger sales
 - Is price competition vigorous?
 - Active efforts to improve quality?
 - Are rivals racing to offer better performance features?
 - Are rivals racing to offer better customer service?
 - Lots of advertising/sales promotions?
 - Active efforts to build a stronger dealer network?
 - Active product innovation?
 - Active use of other weapons of rivalry?



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What Causes Rivalry to be Stronger?



- Active jockeying for position among rivals and frequent launches of new offensives to gain sales and market share
 - One or more firms initiates moves to bolster their standing at expense of rival
- Lots of firms that are relatively equal in size and capability
- Slow market growth
- Industry conditions tempt some firms to go on the offensive to boost volume and market share
- Customers have low costs in switching to rival brands
- A successful strategic move carries a big payoff
- Costs more to get out of business than to stay in
- Firms have diverse strategies, corporate priorities, resources, and

Factors That Affect the Strength of Rivalry



Principle of Competitive Markets

Competitive jockeying among rival firms is **dynamic** and **ever-changing** ...

- As industry members initiate new offensive and defensive moves
- As emphasis swings from one mix of competitive weapons to another

Competitive Force of Potential Entry

Seriousness of threat depends on...

- **Barriers** to entry
- **Reaction** of existing firms to entry

Barriers exist **when**...

- Newcomers confront **obstacles**
- Economic factors put potential entrant at a disadvantage relative to incumbent firms



Factors Affecting the Threat of Entry



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Common Barriers to Entry

- Sizable economies of scale
- Inability to gain access to specialized technology
- Existence of strong learning/experience curve effects
- Strong brand preferences and customer loyalty
- Large capital requirements and/or other specialized resource requirements
- Cost disadvantages independent of size
- Difficulties in gaining access to distribution channels
- Regulatory policies, tariffs, trade restrictions



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Principle of Competitive Markets

Threat of entry is stronger when:

- Entry barriers are low
- Sizable pool of entry candidates exists
- Incumbents are unwilling or unable to contest a newcomer's entry efforts
- Newcomers can expect to earn attractive profits

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Competitive Force of Substitute Products

Concept

Substitutes matter when customers are attracted to the products of firms in **other industries**.

Example
Eyeglasses vs. Contact Lens Sugar vs. Artificial Sweeteners Newspapers vs. TV vs. Internet E-mail vs. Overnight Delivery vs. "Snail mail" (U.S. Post Office)

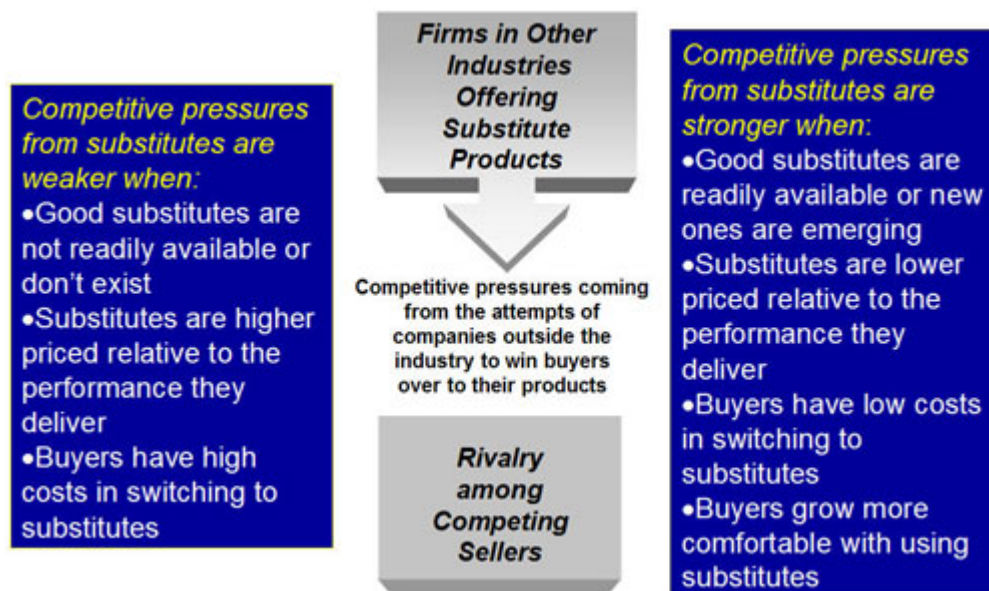
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How to Tell Whether Substitute Products are a Strong Force

- Sales of substitutes are growing rapidly
- Producers of substitutes plan to add new capacity
- Profits of producers of substitutes are up

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Factors Affecting Competition from Substitutes



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Principle of Competitive Markets

Competitive threat of **substitutes** is **stronger** when they are:

- Readily available
- Attractively priced
- Believed to have comparable or better performance features
- Customer switching costs are low

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Competitive Pressures From Suppliers and Supplier-Seller Collaboration



Whether supplier-seller relationships represent a **weak** or **strong** competitive force depends on:

- Whether suppliers can exercise sufficient bargaining leverage to influence terms of supply in their favor
- Extent and competitive importance of collaborative partnerships between one or more sellers and their suppliers

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Competitive Force of Suppliers

Suppliers are a **strong** competitive force **when**:

- Item makes up large portion of product costs, is crucial to production process, and/or significantly affects product quality
- It is costly for buyers to switch suppliers
- They have good reputations and growing demand
- They can supply a component cheaper than industry members can make it themselves
- They do not have to contend with substitutes
- Buying firms are not important customers



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Factors Affecting Supplier Bargaining Power



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Competitive Pressures: Collaboration Between Sellers and Suppliers

Rival sellers are forming long-term strategic partnerships with select suppliers to

- Promote just-in-time deliveries and reduced inventory and logistic costs
- Speed availability of next-generation components
- Enhance quality of parts being supplied
- Reduce suppliers' costs which paves way for lower prices on items supplied



Competitive advantage potential may accrue to industry rivals doing the best job of managing supply-chain relationships

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Principle of Competitive Markets

Suppliers are a **stronger** force the more they can exercise power over:

- Prices charged
- Quality and performance of items supplied
- Reliability of deliveries

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Competitive Pressures From Buyers and Seller-Buyer Collaboration

Whether seller-buyer relationships represent a **weak** or **strong** competitive

force depends on

- Whether buyers have sufficient bargaining leverage to influence terms of sale in their favor
- Extent and competitive importance of collaborative partnerships between one or more sellers and their customers



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Competitive Force of Buyers

Buyers are a strong competitive force when:



- They are large and purchase a sizable percentage of industry's product
- They buy in large quantities
- They can integrate backward
- Industry's product is standardized
- Their costs in switching to substitutes or other brands are low
- They can purchase from several sellers
- Product purchased does not save buyer money

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Competitive Pressures: Collaboration Between Sellers and Buyers

- Partnerships are an increasingly important competitive element in business-to-business relationships
- Collaboration may result in mutual benefits regarding
 - Just-in-time deliveries
 - Order processing
 - Electronic invoice payments
 - On-line sharing of sales at the cash register
- Competitive advantage potential may accrue to industry rivals who do the best job of managing seller-buyer partnerships



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Factors Affecting Buyer Bargaining Power



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Principle of Competitive Markets

Buyers are a **stronger** competitive force the more they have leverage to bargain over:

- Price
- Quality
- Service
- Other terms and conditions of sale

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Strategic Implications of the Five Competitive Forces

Competitive environment is **unattractive** from the standpoint of earning good profits when:

- Rivalry is strong
- Entry barriers are low and entry is likely
- Competition from substitutes is strong
- Suppliers and customers have considerable bargaining power

Competitive environment is **ideal** from a profit-making standpoint when:

- Rivalry is moderate
- Entry barriers are high and no firm is likely to enter
- Good substitutes do not exist
- Suppliers and customers are in a weak bargaining position



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Coping With the Five Competitive Forces



Objective is to craft a strategy...

- To **insulate** firm from competitive forces
- To help make the “**rules**,” placing added pressure on rivals
- Which allows firm to **define** the business model for the industry

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Question 3: What Forces Are at Work to Change Industry Conditions?

- Industries change because **forces** are **driving** industry participants to alter their actions
- **Driving forces** are the **major underlying causes** of changing industry and competitive conditions

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Analyzing Driving Forces

1. Identify those forces likely to exert **greatest influence** over next 1 - 3 years
 - **Usually** no more than **3 - 4** factors qualify as real drivers of change
2. Assess **impact**
 - What **difference** will the forces make - favorable? unfavorable?



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Common Types of Driving Forces

- Internet and e-commerce opportunities
- Increasing globalization of industry

- Changes in long-term industry growth rate
- Changes in who buys the product and how they use it
- Product innovation
- Technological change/process innovation
- Marketing innovation
- Entry or exit of major firms
- Diffusion of technical knowledge
- Changes in cost and efficiency
- Market shift from standardized to differentiated products (or vice versa)
- Regulatory policies / government legislation
- Changing societal concerns, attitudes, and lifestyles
- Changes in degree of uncertainty and risk


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Environmental Scanning

Definition	Monitoring and interpreting sweep of social, political, economic, ecological, and technological events to spot budding trends that could eventually impact industry
Purpose	Raise consciousness of managers about potential developments that could <ul style="list-style-type: none"> • Have important impact on industry conditions • Pose new opportunities and threats

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Question 4: Which Companies are in Strongest / Weakest Positions?

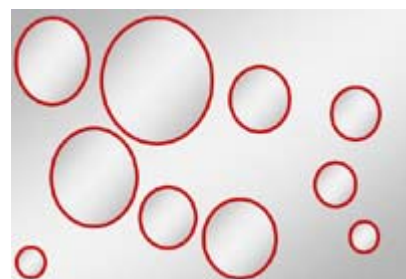
- One technique for revealing the different competitive positions of industry rivals is [strategic group mapping](#)
- A [strategic group](#) consists of those rivals with similar competitive approaches in an industry


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Strategic Group Mapping

Firms in [same strategic group](#) have two or more competitive characteristics in common...

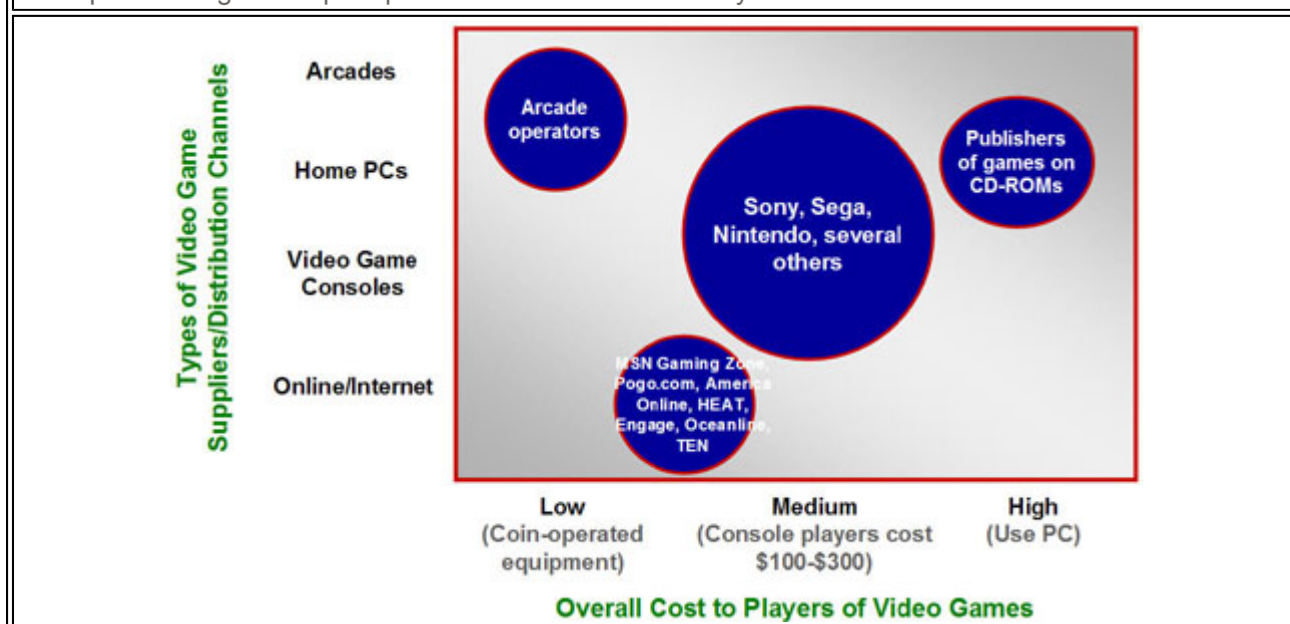
- Sell in same price/quality range
- Cover same geographic areas
- Be vertically integrated to same degree
- Have comparable product line breadth
- Emphasize same types of distribution channels
- Offer buyers similar services
- Use identical technological approaches


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Procedure for Constructing a Strategic Group Map

STEP 1	Identify competitive characteristics that differentiate firms in an industry from one another
STEP 2	Plot firms on a two-variable map using pairs of these differentiating characteristics
STEP 3	Assign firms that fall in about the same strategy space to same strategic group
	Draw circles around each group, making circles proportional to size of group's respective

Example: Strategic Group Map of the Video Game Industry



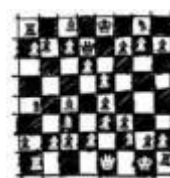
Guidelines: Strategic Group Maps

- Variables selected as axes should **not** be highly correlated
- Variables chosen as axes should expose **big** differences in how rivals compete
- Variables do **not** have to be either quantitative or continuous
- Drawing sizes of circles proportional to combined sales of firms in each strategic group allows map to reflect relative sizes of each strategic group
- If more than two good competitive variables can be used, several maps can be drawn



Interpreting Strategic Group Maps

- Driving forces and competitive pressures often favor some strategic groups and hurt others
- Profit potential of different strategic groups varies due to strengths and weaknesses in each group's market position
- The closer strategic groups are on map, the stronger the competitive rivalry among member firms tends to be



Question 5: What Strategic Moves Are Rivals Likely to Make Next?

A firm's own best strategic moves are affected by ...

- Current strategies of competitors
- Future actions of competitors

Profiling key rivals involves gathering **competitive intelligence** about their ...

- Current strategies



- Most recent moves
- Resource strengths and weaknesses
- Announced plans

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Competitor Analysis

Successful strategists take great pains in scouting competitors to ...

- Understand their strategies
- Watch their actions
- Evaluate their vulnerability to driving forces and competitive pressures
- Size up their resource strengths and weaknesses and their capabilities
- Try to anticipate rivals' next moves

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Categorizing Objectives and Strategies of Competitors

Competitive Scope	Strategic Intent	Market Share Objective	Competitive Position	Strategic Posture	Competitive Strategy
• Local	• Be dominant leader	• Aggressive expansion via acquisition & internal growth	• Getting stronger; on the move	• Mostly offensive	• Striving for low-cost leadership
• Regional	• Overtake industry leader		• Well-entrenched	• Mostly defensive	• Focusing on market niche
• National	• Be among industry leaders	• Expansion via internal growth	• Stuck in the middle of the pack	• Combination of offensive & defensive	• Pursuing differentiation based on • Quality • Service • Technology superiority • Breadth of product line • Image & reputation • More value for the money • Other attributes
• Multicountry	• Move into top 10	• Expansion via acquisition	• Going after a different position	• Aggressive risk-taker	
• Global	• Move up a notch in rankings	• Hold on to present share	• Struggling; losing ground	• Conservative follower	
	• Maintain current position	• Give up present share to achieve short-term profits	• Retrenching to a position that can be defended		
	• Just survive				

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Predicting Moves of Rivals

Predicting rivals' next moves involves...

- Analyzing their current competitive positions
- Examining public pronouncements about what it will take to be successful in industry
- Gathering information from grapevine about current activities and potential changes
- Studying past actions and leadership
- Determining who has flexibility to make major strategic changes and who is locked into pursuing same basic strategy

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Question 6: What are the Key Factors for Competitive Success?

Competitive elements most affecting every industry member's ability to

prosper ...

- Specific strategy elements
- Product attributes
- Resources
- Competencies
- Competitive capabilities

Key Success Factors (KSFs) spell the difference between ...

- Profit and loss
- Competitive success or failure

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Identifying Industry Key Success Factors

Answers to three questions pinpoint **KSFs** ...

- On what basis do customers choose between competing brands of sellers?
- What resources and competitive capabilities does a seller need to have to be competitively successful?
- What does it take for sellers to achieve a sustainable competitive advantage?

KSFs consist of the **3 - 5** really **major** determinants of financial and competitive success in an industry

[GOTO TOP](#)

Common Types of Key Success Factors

Technology-related	Scientific research expertise; Product innovation capability; Expertise in a given technology; Capability to use Internet to conduct various business activities
Manufacturing-related	Low-cost production efficiency; Quality of manufacture; High use of fixed assets; Low-cost plant locations; High labor productivity; Low-cost product design; Flexibility to make a range of products
Distribution-related	Strong network of wholesale distributors/dealers; Gaining ample space on retailer shelves; Having company-owned retail outlets; Low distribution costs; Fast delivery
Marketing-related	Fast, accurate technical assistance; Courteous customer service; Accurate filling of orders; Breadth of product line; Merchandising skills; Attractive styling; Customer guarantees; Clever advertising
Skills-related	Superior workforce talent; Quality control know-how; Design expertise; Expertise in a particular technology; Ability to develop innovative products; Ability to get new products to market quickly
Organizational capability	Superior information systems; Ability to respond quickly to shifting market conditions; Superior ability to employ Internet to conduct business; More experience & managerial know-how
Other types	Favorable image/reputation with buyers; Overall low-cost; Convenient locations; Pleasant, courteous employees; Access to financial capital; Patent protection

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Example: KSFs for ...



Apparel Manufacturing Industry

- Fashion design -- to create buyer appeal
- Low-cost manufacturing efficiency -- to keep selling prices competitive



Tin and Aluminum Can Industry

- Locating plants close to end-use customers - to keep costs of shipping empty cans low

- Ability to market plant output within economical shipping distances

[GOTO TOP](#)

Strategic Management Principle

A sound strategy incorporates efforts to be **competent on all** industry key success factors
and to **excel on at least one** factor!

[GOTO TOP](#)

Question 7: Is the Industry Attractive or Unattractive and Why?

Objective

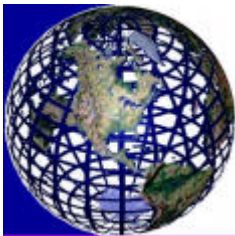
Develop conclusions about whether the industry and competitive environment is **attractive** or **unattractive**, both near- and long-term, for earning good profits

Principles

A firm uniquely well-suited in an otherwise unattractive industry can, under certain circumstances, still earn unusually good profits

[GOTO TOP](#)

Things to Consider in Assessing Industry Attractiveness



- Industry's market size and growth potential
- Whether competitive conditions are conducive to rising/falling industry profitability
- Will competitive forces become stronger or weaker
- Whether industry will be favorably or unfavorably impacted by driving forces
- Potential for entry/exit of major firms
- Stability/dependability of demand
- Severity of problems facing industry
- Degree of risk and uncertainty in industry's future

[GOTO TOP](#)

Conducting an Industry and Competitive Situation Analysis

Two things to keep in mind ...

1. Evaluating industry and competitive conditions cannot be reduced to a formula-like exercise--**thoughtful analysis is essential**
2. Sweeping industry and competitive analyses need to be done every 1 to 3 years

[GOTO TOP](#)

Lesson 4 - Evaluating Company Resources And Competitive Capabilities

Company Situation Analysis: The Key Questions | Question 1: How well is firm's present strategy working? | Question 2: What are the firm's resource strengths and weaknesses and its external opportunities and threats? | Question 3: Are firm's prices and costs competitive? | Question 4: How strong is firm's competitive position relative to rivals? | Question 5: What strategic issues does firm face?

"Understand what really makes a company 'tick'."

Charles R. Scott

"If a company is not 'best in world' at a critical activity, it is sacrificing competitive advantage by performing that activity with its existing technique."

James Brian Quinn

Lesson Outline

- How Well the Company's Present Strategy Is Working
- SWOT Analysis
- Resource Strengths and Weaknesses
- Opportunities and Threats
- Strategic Cost Analysis and Value Chains
- Assess a Firm's Competitive Position
- Identify Strategic Issues

Company Situation Analysis: The Key Questions



- How well is firm's present strategy working?
- What are the firm's resource strengths and weaknesses and its external opportunities and threats?
- Are firm's prices and costs competitive?
- How strong is firm's competitive position relative to rivals?
- What strategic issues does firm face?

[GOTO TOP](#)

Question 1: How Well is the Present Strategy Working?

- Two steps involved
 - Determine **current strategy** of company

- ▶ Examine key indicators of **strategic** and **financial** performance



[KEY QUESTIONS](#) | [GOTO TOP](#)

What is the Strategy?

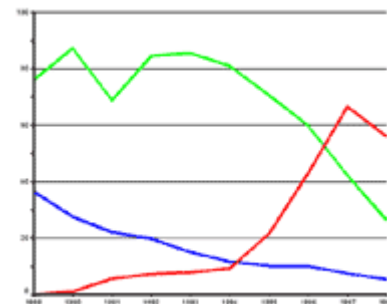


- Identify competitive approach
 - Low-cost leadership
 - Differentiation
 - Focus on a particular market niche
- Determine competitive scope
 - Stages of industry's production/distribution chain
 - Geographic coverage
 - Customer base
- Identify functional strategies
- Examine recent strategic moves

[QUESTION 1](#) | [GOTO TOP](#)

Key Indicators of How Well the Strategy is Working

- Trend in sales and market share
- Acquiring and/or retaining customers
- Trend in profit margins
- Trend in net profits, ROI, and EVA
- Overall financial strength and credit ranking
- Efforts at continuous improvement activities
- Trend in stock price and stockholder value
- Image and reputation with customers
- Leadership role(s) -- technology, quality, innovation, e-commerce, etc.



[QUESTION 1](#) | [GOTO TOP](#)

Question 2: What Are the Firm's Strengths, Weaknesses, Opportunities and Threats ?

▶ **S W O T** represents the first letter in

- ▶ **S** trengths
- ▶ **W** eaknesses
- ▶ **O** pportunities
- ▶ **T** hreats



- ▶ For a company's strategy to be well-conceived, it must be matched to **both**
 - ▶ Resource strengths and weaknesses
 - ▶ Best market opportunities and external threats to its well-being

[KEY QUESTIONS](#) | [GOTO TOP](#)

Identifying Resource Strengths and Competitive Capabilities



- A strength is something a firm does well or a characteristic that enhances its competitiveness
- Valuable competencies or know-how
- Valuable physical assets
- Valuable human assets
- Valuable organizational assets
- Valuable intangible assets
- Important competitive capabilities
- An attribute that places a company in a position of market advantage
- Alliances or cooperative ventures with capable partners

Resource strengths and competitive capabilities are competitive assets !

Figure 4.1: Mobilizing Company Resources to Produce Competitive Advantage



[QUESTION 2](#) | [GOTO TOP](#)

Identifying Resource Weaknesses and Competitive Deficiencies



- A weakness is something a firm lacks, does poorly, or a condition placing it at a disadvantage
- Resource weaknesses relate to
- Deficiencies in know-how or expertise or competencies
- Lack of important physical, organizational, or intangible assets
- Missing capabilities in key areas

Resource weaknesses and deficiencies are competitive liabilities !

Table 4.1: SWOT Analysis - What to Look For

Potential Resource Strengths	Potential Resource Weaknesses	Potential Company Opportunities	Potential External Threats
Powerful strategy Strong financial condition Strong brand name image/reputation Widely recognized market leader Proprietary technology Cost advantages Strong advertising Product innovation skills Good customer service Better product quality Alliances or JVs	No clear strategic direction Obsolete facilities Weak balance sheet; excess debt Higher overall costs than rivals Missing some key skills/competencies Subpar profits Internal operating problems . . . Falling behind in R&D Too narrow product line Weak marketing skills	Serving additional customer groups Expanding to new geographic areas Expanding product line Transferring skills to new products Vertical integration Take market share from rivals Acquisition of rivals Alliances or JVs to expand coverage Openings to exploit new technologies Openings to extend brand name/image	Entry of potent new competitors Loss of sales to substitutes Slowing market growth Adverse shifts in exchange rates & trade policies Costly new regulations Vulnerability to business cycle Growing leverage of customers or suppliers Reduced buyer needs for product Demographic changes

[QUESTION 2 | GOTO TOP](#)

Competencies vs. Core Competencies vs. Distinctive Competencies

A company **competence** is the product of organizational learning and experience and represents real **proficiency** in performing an **internal activity**

A **core competence** is a well-performed internal activity that is **central** (not

peripheral or incidental) to a company's **competitiveness and profitability**

A **distinctive competence** is a **competitively valuable activity** that a company performs better than its rivals



QUESTION 2 | GOTO TOP

Company Competencies and Capabilities



- ▶ Stem from **skills, expertise, and experience** usually representing an
 - ▶ Accumulation of **learning** over time and
 - ▶ Gradual buildup of **real proficiency in performing an activity**

- ▶ Involve **deliberate efforts** to develop the ability to do something, often entailing
 - ▶ Selection of people with requisite knowledge and expertise
 - ▶ Upgrading or expanding individual abilities
 - ▶ Molding work products of individuals into a cooperative effort to create organizational ability
 - ▶ A conscious effort to create **intellectual capital**

QUESTION 2 | GOTO TOP

Core Competencies: A Valuable Company Resource

A **competence** becomes a **core competence** when the well-performed activity is **central** to the company's competitiveness and profitability

Often, a core competence results from **collaboration** among different parts of an organization

Typically, core competencies reside in a company's **people**, not in assets on the balance sheet

A core competence gives a company a potentially valuable **competitive capability** and represents a definite **competitive asset**



Types of Core Competencies

- Expertise in building networks and systems to enable e-commerce
- Speeding new/next-generation products to market
- Better after-sale service capability
- Skills in manufacturing a high quality product
- Innovativeness in developing popular product features

- Speed/agility in responding to new market trends
- System to fill customer orders accurately and swiftly
- Expertise in integrating multiple technologies to create families of new products

QUESTION 2 | GOTO TOP

Distinctive Competence -- A Competitively **Superior** Resource

A **distinctive competence** is a competitively significant activity that a company **performs better than its competitors**







A distinctive competence :

- Represents a **competitively valuable capability** rivals do not have
- Presents attractive potential for being a **cornerstone of strategy**
- Can provide a **competitive edge** in the marketplace—because it represents a competitively **superior** resource strength

Strategic Management Principle

A distinctive competence empowers a company to build **competitive advantage**!

Examples of Distinctive Competencies

Sharp Corporation		Expertise in flat-panel display technology
Toyota	  	Low-cost
Honda		High-quality manufacturing capability
Nissan		Short design-to-market cycles
Intel		Ability to design and manufacture ever more powerful microprocessors for PCs
Motorola		Defect-free manufacture (six-sigma quality) of cell phones

QUESTION 2 | GOTO TOP

Determining the Competitive Value of a Company Resource

To qualify as the basis for **sustainable competitive advantage**, a “**resource**” must pass 4 tests

1. Is the resource **hard to copy**?
2. Does the resource have **staying power** -- is it **durable**?
3. Is the resource really **competitively superior**?
4. Can the resource be **trumped** by the different capabilities of rivals?

Successful strategists seek to capitalize on and leverage a company's resource strengths—its **expertise**, **core competencies**, and strongest **competitive capabilities**—by molding the strategy around the resource strengths !

Strategic Management Principle

Successful strategists seek to capitalize on and leverage a company's resource strengths—its expertise, core competencies, and strongest competitive capabilities—**by molding the strategy around the resource strengths !**

[QUESTION 2 | GOTO TOP](#)

Identifying a Company's Market Opportunities



Opportunities most relevant to a company are those offering :

- Best prospects for profitable **long-term growth**
- Potential for **competitive advantage**
- **Good match** with its financial and organizational resource capabilities

Strategic Management Principle

A company is well-advised to pass on a particular market opportunity unless it has or can build the resource capabilities to capture it!

Identifying External Threats



- Emergence of cheaper/better technologies
- Introduction of better products by rivals
- Intensifying competitive pressures
- Onerous regulations
- Rise in interest rates
- Potential of a hostile takeover
- Unfavorable demographic shifts
- Adverse shifts in foreign exchange rates
- Political upheaval in a country

Strategic Management Principle

Successful strategists aim at capturing a company's best growth opportunities and creating defenses against external threats to its competitive position and future performance!

[QUESTION 2 | GOTO TOP](#)

Role of SWOT Analysis in Crafting a Better Strategy



Developing a clear understanding of a company's

- Resource **strengths**
- Resource **weaknesses**
- Best **opportunities**
- External **threats**

Drawing conclusions about how

- Company's strategy can be matched to both its resource capabilities and market opportunities
- Urgent it is for company to correct resource weaknesses and guard against external threats

[QUESTION 2 | GOTO TOP](#)

Question 3: Are the Company's Prices and Costs Competitive?

- Assessing whether a firm's costs are competitive with those of rivals is a crucial part of company analysis
- Key analytical tools
 - Strategic cost analysis
 - Value chain analysis
 - Benchmarking



[KEY QUESTIONS | GOTO TOP](#)

Why Rival Companies Have Different Costs

Companies do not have the same costs because of differences in

- Prices paid for raw materials, component parts, energy, and other supplier resources
- Basic technology and age of plant & equipment
- Economies of scale and experience curve effects
- Wage rates and productivity levels
- Marketing, promotion, and administration costs
- Inbound and outbound shipping costs
- Forward channel distribution costs

Principle of Competitive Markets

The higher a company's costs are above those of close rivals, the more competitively vulnerable it becomes!

[QUESTION 3 | GOTO TOP](#)

What is Strategic Cost Analysis?



- Focuses on a firm's costs relative to its rivals
- Compares a firm's costs activity by activity against costs of key rivals
- From raw materials purchase to
- Price paid by ultimate customer
- Pinpoints which internal activities are a source of cost advantage or disadvantage

[QUESTION 3 | GOTO TOP](#)

The Concept of a Company Value Chain

A company consists of all the activities and functions it performs in trying to deliver value to its customers.

A company's **value chain** shows the linked **set of activities, functions, and business processes** that it performs in the course of *designing, producing, marketing, delivering, and supporting* its product / service and thereby **creating value for its customers**.



A company's value chain consists of two types of activities :

- **Primary activities** (where most of the value for customers is created)
- **Support activities** that are undertaken to aid the individuals and groups engaged in doing the primary activities

Figure 4.2: Typical Company Value Chain

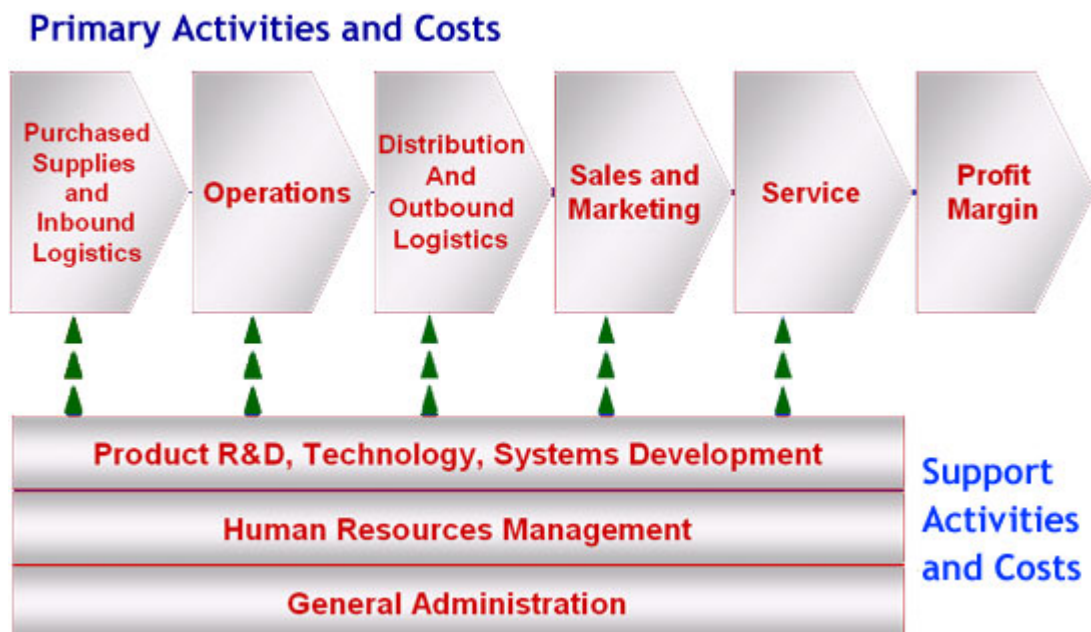


Figure 4.3: The Value Chain System for an Entire Industry

QUESTION 3 | GOTO TOP

The Value Chain System for an Entire Industry

Assessing a company's **cost competitiveness** involves comparing costs all along the industry's value chain



Suppliers' value chains are relevant because

- Costs, quality, and performance of inputs provided by suppliers influence a firm's own costs and product performance

Forward channel allies' value chains are relevant because

- Forward channel allies' costs and margins are part of price paid by ultimate end-user
- Activities performed affect end-user satisfaction

Example: Key Value Chain Activities

Pulp and Paper Industry	
	<ul style="list-style-type: none"> • Timber farming • Logging • Pulp mills • Papermaking • Printing & publishing
Home Appliance Industry	
	<ul style="list-style-type: none"> • Parts and components manufacture • Assembly • Wholesale distribution • Retail sales
Soft Drink Industry	



- Processing of basic ingredients
- Syrup manufacture
- Bottling and can filling
- Wholesale distribution
- Retailing

Computer Software Industry



- Programming
- Disk loading
- Marketing
- Distribution

QUESTION 3 | GOTO TOP

Activity-Based Costing: A Key Tool in Strategic Cost Analysis

Determining whether a company's costs are in line with those of rivals requires measuring how a company's costs compare with those of rivals **activity-by-activity**-- from one end of the value chain to the other

Requires having accounting data that measures the cost of each value chain activity

Activity-based accounting systems provide the data for determining the costs for each relevant value chain activity



Table 4.2: Traditional Cost Accounting vs. Activity-Based Costing

Traditional Cost Accounting Categories in Department Budget		Departmental Activities Using Activity-Based Cost Accounting	
Wages & Salaries	\$350,000	Evaluate Suppliers	\$135,750
Employee Benefits	115,000	Process Purchase Orders	82,100
Supplies	6,500	Expedite Deliveries	23,500
Travel	2,400	Expedite Internal Process	15,840
Depreciation	17,000	Check Item Quality	94,300
Other Fixed Charges	124,000	Check Deliveries Against	48,450
Miscellaneous	25,520	Purchase Orders	110,000
Operating Expenses		Resolve Problems	130,210
		Internal Administration	
	\$640,150		\$640,150

Benchmarking Costs of Key Value Chain Activities

Focuses on **cross-company** comparisons of **how** certain activities are performed and the costs associated with these activities

- Purchase of materials
- Payment of suppliers
- Management of inventories
- Training of employees
- Processing of payrolls
- Getting new products to market
- Performance of quality control
- Filling and shipping of customer orders



Objectives of Benchmarking

Determine whether a company is performing particular value chain activities efficiently by studying the practices and procedures used by other companies

Understand the **best practices** in performing an activity—learn what is the “best” way to do a particular activity from those who have demonstrated they are “best-in-industry” or “best-in-world”

Assess if company’s costs of performing particular value chain activities are in line with competitors

Learn how other firms achieve lower costs

Take action to improve company’s cost competitiveness

Ethical Standards in Benchmarking: **Do’s** and **Don’ts**



- Avoid talk about pricing or competitively sensitive costs
- Don’t ask rivals for sensitive data
- Don’t share proprietary data without clearance
- Have impartial third party assemble and present competitively sensitive cost data with no names attached
- Don’t disparage a rival’s business to outsiders based on data obtained

What Determines Whether a Company is Cost Competitive?

A company’s **cost competitiveness** depends on how well it manages its **value chain** relative to how well competitors manage their value chains

When a company’s costs are “out-of-line”, the “high- cost” activities can exist in any of three areas in the industry value chain :

1. Suppliers’ activities
2. The company’s own internal activities
3. Forward channel activities



QUESTION 3 | GOTO TOP

Correcting **Supplier-Related Cost Disadvantages**: Options

- Negotiate more favorable prices with suppliers
- Work with suppliers to help them achieve lower costs
- Use lower-priced substitute inputs
- Collaborate closely with suppliers to identify mutual cost-saving opportunities
- Integrate backwards
- Make up difference by initiating cost savings in other areas of value chain

Correcting **Forward Channel Cost Disadvantages**: Options

- Push for more favorable terms with distributors and other forward channel allies
- Work closely with forward channel allies and customers to identify win-win opportunities to reduce costs
- Change to a more economical distribution strategy
- Make up difference by initiating cost savings earlier in value chain

Correcting **Internal Cost Disadvantages**: Options

- Reengineer how the high-cost activities or business processes are performed
- Eliminate some cost-producing activities altogether by revamping value chain system
- Relocate high-cost activities to lower-cost geographic areas
- See if high-cost activities can be performed cheaper by outside vendors/suppliers
- Invest in cost-saving technology
- Simplify product design
- Make up difference by achieving savings in backward or forward portions of value chain system

QUESTION 3 | GOTO TOP

From Value Chain Analysis to Competitive Advantage

A company can create **competitive advantage** by managing its value chain to:

- **Integrate** knowledge and skills of employees in competitively valuable ways
- **Leverage** economies of learning / experience
- **Coordinate** related activities in ways that build valuable capabilities
- **Build dominating expertise** in a value chain activity critical to customer satisfaction or market success



Strategy-Making Lesson of Value Chain Analysis

Sustainable competitive advantage can be created by

1. Managing value chain activities better than rivals and/or
2. Developing distinctive value chain capabilities to serve customers!

[QUESTION 3](#) | [GOTO TOP](#)

Question 4: How Strong is the Company's Competitive Position?



The strength of a company's competitive position in the marketplace hinges on

- Whether firm's position can be expected to improve or deteriorate if present strategy is continued
- How firm ranks relative to key rivals on each industry KSF and relevant measure of competitive strength
- Whether firm has a sustainable competitive advantage or finds itself at disadvantage relative to certain rivals
- Ability of firm to defend its position in light of
 - Industry driving forces
 - Competitive pressures
 - Anticipated moves of rivals

[KEY QUESTIONS](#) | [GOTO TOP](#)

Assessing a Company's Competitive Strength versus Key Rivals

1. List industry key success factors and other relevant measures of competitive strength
2. Rate firm and key rivals on each factor using rating scale of 1 to 10 (1 = very weak; 5 = average; 10 = very strong)
3. Decide whether to use a **weighted** or **unweighted** rating system (a weighted system is usually superior because the chosen strength measures are unlikely to be equally important)
4. Sum individual ratings to get an overall measure of competitive strength for each rival
5. Determine whether firm enjoys a competitive advantage or suffers from a competitive disadvantage based on the overall strength ratings



Table 4.4 (A): An Unweighted Competitive Strength Assessment

KSF/Strength Measure	ABC Co.	Rival 1	Rival 2	Rival 3	Rival 4
Quality/product performance	8	5	10	1	6
Reputation/image	8	7	10	1	6
Manufacturing capability	2	10	4	5	1
Technological skills	10	1	7	3	8
Dealer network/distribution	9	4	10	5	1
New product innovation	9	4	10	5	1

Financial resources	5	10	7	3	1
Relative cost position	5	10	3	1	4
Customer service capability	5	7	10	1	4
Overall strength rating	61	58	71	25	32

Table 4-4 (B): A Weighted Competitive Strength Assessment

KSF/Strength Measure	weight	ABC Co.	Rival 1	Rival 2	Rival 3	Rival 4
Quality/product performance	0.10	8/0.8	5/0.5	10/1.00	1/0.1	6/0.6
Reputation/image	0.10	8/0.8	7/0.7	10/1.00	1/0.1	6/0.6
Manufacturing capability	0.10	2/0.2	10/1.00	4/0.4	5/0.5	1/0.1
Technological skills	0.05	10/0.5	1/0.05	7/0.35	3/0.15	8/0.40
Dealer network/distribution	0.05	9/0.45	4/0.2	10/0.5	5/0.25	1/0.05
New product innovation	0.05	9/0.45	4/0.2	10/0.5	5/0.25	1/0.05
Financial resources	0.10	5/0.5	10/1.00	7/0.7	3/0.3	1/0.10
Relative cost position	0.35	5/1.75	10/3.50	3/1.05	1/0.35	4/1.40
Customer service capability	0.15	5/0.75	7/1.05	10/1.5	1/0.15	4/1.60
Sum of Weights	1.00					
Overall strength rating		6.2	8.2	7.0	2.1	2.9

QUESTION 4 | GOTO TOP

Why Do a Competitive Strength Assessment ?

- Reveals strength of firm's competitive position vis-à-vis key rivals
- Shows how firm stacks up against rivals, measure-by-measure—pinpoints firm's competitive strengths and competitive weaknesses
- Indicates whether firm is at a competitive advantage / disadvantage against each rival
- Identifies possible offensive attacks (pit company strengths against rivals' weaknesses)
- Identifies possible defensive actions (a need to correct competitive weaknesses)

QUESTION 4 | GOTO TOP

Question 5: What Strategic Issues Does the Company Need to Address?

Based on the answers to the preceding 4 questions and the 7 questions posed in conducting industry and competitive analysis, what items should be on the company's "worry list"?

Requires thinking strategically about

- Pluses and minuses in the industry and competitive situation
- Company's resource strengths and weaknesses and attractiveness of its competitive position

A "good" strategy must address "what to do" about each and every strategic issue!

KEY QUESTIONS | GOTO TOP

Identifying the Strategic Issues

- Is the present strategy adequate in light of competitive pressures and driving forces?
- Is the strategy well-matched to the industry's future key success factors?
- Does the company need new or different resource strengths and competitive capabilities?
- Does present strategy adequately protect against external threats and resource deficiencies?
- Is firm vulnerable to competitive attack by rivals?
- Where are strong/weak spots in present strategy?

[QUESTION 5](#) | [GOTO TOP](#)

Stating the Issues Clearly and Precisely

- A well-stated issue involves such phrases as
 - "What should be done about"?
 - "How to"?
 - "Whether to"?
 - "Should we"?
- Issues need to be precise, specific, and "cut straight to the chase"
- Issues on the "the worry list" raise questions about
 - What actions need to be considered
 - What to think about doing

[QUESTION 5](#) | [GOTO TOP](#)

Lesson 5 - Strategy And Competitive Advantage

Strategy and Competitive Advantage | The Five Generic Competitive Strategies | Cooperative Strategies | Merger and Acquisition Strategies | Vertical Integration Strategies | Offensive and Defensive Strategies | First-Mover Advantages and Disadvantages

“The essence of strategy lies in creating tomorrow’s competitive advantages faster than competitors mimic the ones you possess today.”

Gary Hamel and C.K. Prahalad

“Strategies for taking the hill won’t necessarily hold it.”

Amar Bhide

Lesson Outline

- Five Generic Competitive Strategies
 - Low-Cost Leadership Strategy
 - Broad Differentiation Strategies
 - Best-Cost Provider Strategies
 - Focused Low-Cost Strategies
 - Focused Differentiation Strategies
- Cooperative Strategies
- Merger and Acquisition Strategies
- Vertical Integration Strategies
- Offensive and Defensive Strategies
- First-Mover Advantages and Disadvantages

[GOTO TOP](#)

Strategy and Competitive Advantage



Competitive advantage exists when a firm’s strategy gives it an edge in

- Defending against competitive forces and
- Securing customers

Key to Gaining a Competitive Advantage

Convince customers firm’s product / service offers superior value

- Offer buyers a good product at a lower price
- Use differentiation to provide a better product buyers think is worth a premium price

What is “Competitive Strategy”?

- Consists of a company’s market initiatives and business approaches to
 - **Attract and please** customers
 - **Withstand** competitive pressures
 - **Strengthen** market position
- Includes offensive and defensive moves to
 - **Counter actions** of key rivals
 - **Shift resources** to improve long -term market position
 - **Respond** to prevailing market conditions
- **Narrower in scope** than business strategy

Objectives of Competitive Strategy

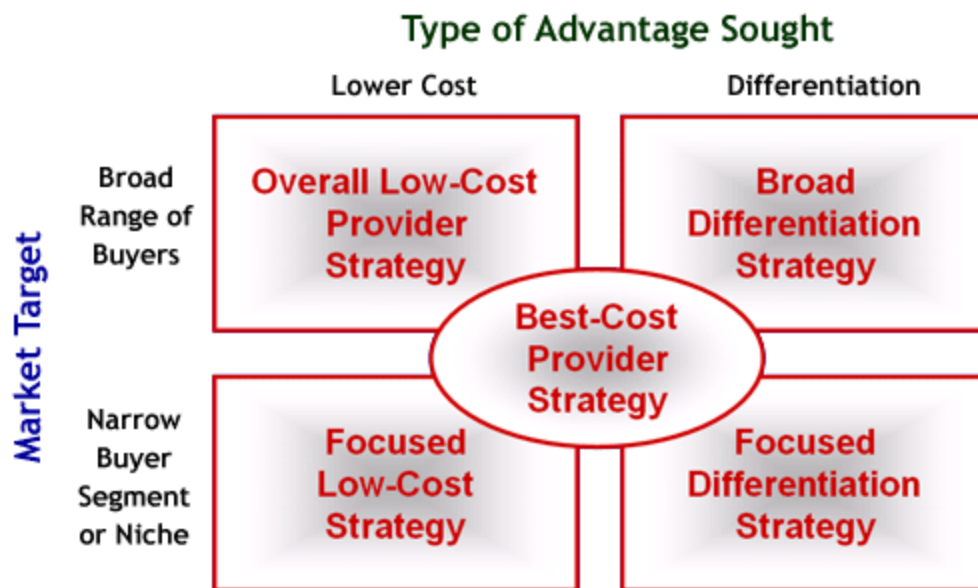
- Build a **competitive advantage**
- Cultivate clientele of **loyal customers**
- **Knock the socks off rivals**, ethically and honorably



[GOTO TOP](#)

The Five Generic Competitive Strategies

Figure 5.1: The Five Generic Competitive Strategies



[GOTO TOP](#)

Low-Cost Leadership

Keys to Success



- Make achievement of low-cost relative to rivals the theme of firm's business strategy
- Find ways to drive costs out of business year-after-year

Low-cost leadership means low **overall** costs, not just low manufacturing or production costs!

FIVE COMPETITIVE STRATEGIES | GOTO TOP

Options: Achieving a Low-Cost Strategy

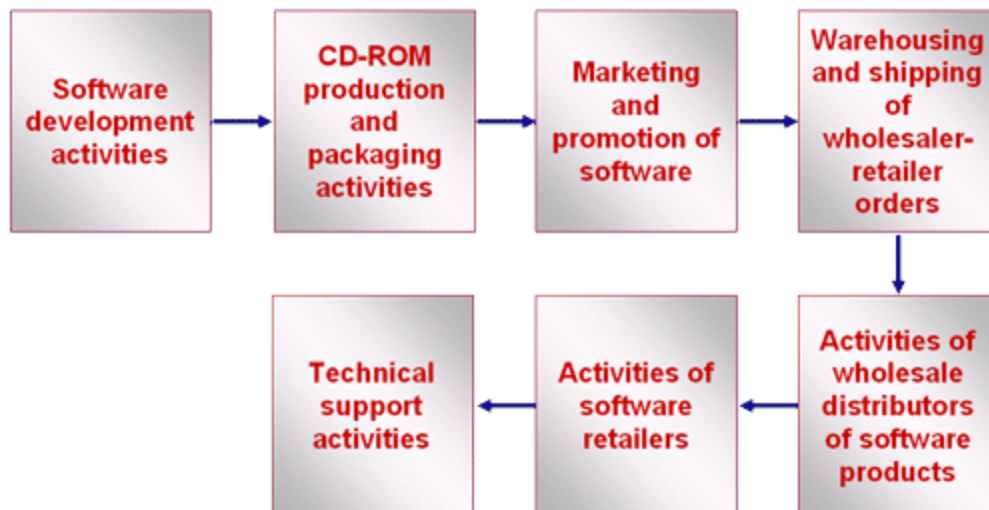
Open up a **sustainable cost advantage** over rivals, using lower-cost edge to **either**

- **Under-price rivals** and reap market share gains
- or
- **Earn higher profit** margin selling at going price



Figure 5.2: Reconfiguring Value Chain Systems to Lower Costs – Software Industry

A. Value Chain System of Software Developers Using Traditional Wholesale-Retail Channels - Highest Cost



B. Value Chain System of Software Developers Using Direct Sales and Physical Delivery of CDs



C. Value Chain System of Software Developers Using Online Sales and Internet Delivery - **Lowest Cost**



FIVE COMPETITIVE STRATEGIES | LOW COST STRATEGY | GOTO TOP

Approaches to Securing a Cost Advantage

Approach 1: Do a better job than rivals of performing value chain activities efficiently and cost effectively

Approach 2 : Revamp value chain to bypass cost-producing activities that add little value from the buyer's perspective

Approach 1: Controlling the Cost Drivers



- Capture scale economies; avoid scale diseconomies
- Capture learning and experience curve effects
- Manage costs of key resource inputs
- Consider linkages with other activities in value chain
- Find sharing opportunities with other business units
- Compare vertical integration vs. outsourcing
- Assess first-mover advantages vs. disadvantages
- Control percentage of capacity utilization
- Make prudent strategic choices related to operations

Approach 2: Revamping the Value Chain

- Abandon traditional business methods and shift to e-business technologies and use of Internet
- Use direct-to-end-user sales/marketing methods
- Simplify product design
- Offer basic, no-frills product/service
- Shift to a simpler, less capital-intensive, or more flexible technological process
- Find ways to bypass use of high-cost raw materials



- Relocate facilities closer to suppliers or customers
- Drop “something for everyone” approach and focus on a limited product/service
- Reengineer core business processes

FIVE COMPETITIVE STRATEGIES | LOW COST STRATEGY | GOTO TOP

Keys to Success in Achieving Low-Cost Leadership

- Scrutinize each cost-creating activity, identifying cost drivers
- Use knowledge about cost drivers to manage costs of each activity down year after year
- Find ways to reengineer how activities are performed and coordinated—eliminate the costs of unnecessary work steps
- Be creative in cutting low value-added activities out of value chain system—re-invent the industry value chain



Characteristics of a Low-Cost Provider



- Cost conscious corporate culture
- Employee participation in cost-control efforts
- Ongoing efforts to benchmark costs
- Intensive scrutiny of budget requests
- Programs promoting continuous cost improvement

Successful low-cost producers **champion frugality** but wisely and aggressively **invest in cost-saving improvements** !

FIVE COMPETITIVE STRATEGIES | LOW COST STRATEGY | GOTO TOP

When Does a Low-Cost Strategy Work Best?

- Price competition is vigorous
- Product is standardized or readily available from many suppliers
- There are few ways to achieve differentiation that have value to buyers
- Most buyers use product in same ways
- Buyers incur low switching costs
- Buyers are large and have significant bargaining power
- Industry newcomers use introductory low prices to attract buyers and build customer base



Pitfalls of Low-Cost Strategies



- Being overly aggressive in cutting price
- Low cost methods are easily imitated by rivals
- Becoming too fixated on reducing costs and ignoring
 - Buyer interest in additional features
 - Declining buyer sensitivity to price
 - Changes in how the product is used
- Technological breakthroughs open up cost reductions for rivals

[FIVE COMPETITIVE STRATEGIES](#) | [LOW COST STRATEGY](#) | [GOTO TOP](#)

Differentiation Strategies

Objective

Incorporate differentiating features that cause buyers to prefer firm’s product or service over brands of rivals

Keys to Success

- Find ways to differentiate that create value for buyers and that are not easily matched or cheaply copied by rivals
- Not spending more to achieve differentiation than the price premium that can be charged



[FIVE COMPETITIVE STRATEGIES](#) | [GOTO TOP](#)

Appeal of Differentiation Strategies



A powerful competitive approach when **uniqueness** can be achieved in ways that

- Buyers perceive as **valuable** and are willing to pay for
- Rivals find **hard to match or copy**
- Can be incorporated at a **cost well below the price premium that buyers will pay**

Benefits of Successful Differentiation

A product / service with unique and appealing attributes allows a firm to :

- Command a **premium price** and/or
- Increase unit sales** and/or
- Build brand loyalty**

= **Competitive Advantage**

[FIVE COMPETITIVE STRATEGIES](#) | [DIFFERENTIATION STRATEGY](#) | [GOTO TOP](#)

Types of Differentiation Themes

Dr. Pepper	Unique Taste
------------	--------------

		
Microsoft Windows and Office		Multiple features
Home Depot and Amazon.com		Wide selection and one-stop shopping
FedEx		Superior service
Ritz-Carlton		
Caterpillar		Spare parts availability
McDonald's		More for your money
Wal-Mart		
Rolex		Prestige
Honda, Toyota		Quality manufacture
3M Corporation		Technological leadership
Intel		
Ralph Lauren, Chanel		Top-of-the-line image

Sustaining Differentiation: The Key to Competitive Advantage

Most appealing approaches to differentiation

- Those hardest for rivals to match or imitate
- Those buyers will find most appealing

Best choices for gaining a **longer-lasting**, **more profitable** competitive edge

- New product innovation
- Technical superiority
- Product quality and reliability
- Comprehensive customer service
- Unique competitive capabilities



Where to Find Differentiation Opportunities in the Value Chain

- Purchasing and procurement activities
- Product R&D and product design activities
- Production process / technology-related activities
- Manufacturing / production activities
- Distribution-related activities
- Marketing, sales, and customer service activities



How to Achieve a Differentiation-Based Advantage

Approach 1

Incorporate product features/attributes that **lower buyer's overall costs** of using product

Approach 2

Incorporate features/attributes that **raise the performance a buyer gets** out of the product

Approach 3

Incorporate features/attributes that *enhance buyer satisfaction* in non-economic or intangible ways

Approach 3

Compete on the basis of *superior capabilities*

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Signaling Value as Well as Delivering Value



- Buyers seldom pay for value that is not perceived
- *Signals of value* may be as important as *actual value* when
 - Nature of differentiation is hard to quantify
 - Buyers are making first-time purchases
 - Repurchase is infrequent
 - Buyers are unsophisticated

When Does a Differentiation Strategy Work Best?

- There are many ways to differentiate a product that have value and please customers
- Buyer needs and uses are diverse
- Few rivals are following a similar differentiation approach
- Technological change and product innovation are fast-paced



Pitfalls of Differentiation Strategies



- Trying to differentiate on a feature buyers do not perceive as lowering their cost or enhancing their well-being
- Over-differentiating such that product features exceed buyers' needs
- Charging a price premium that buyers perceive is too high
- Failing to signal value
- Not understanding what buyers want or prefer and differentiating on the "wrong" things

Competitive Strategy Principle

A low-cost provider strategy can **defeat** a differentiation strategy when buyers are satisfied with a standard product and do not see extra differentiating attributes as worth paying for!

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Best Cost Provider Strategies

Combine a strategic emphasis on *low-cost* with a strategic emphasis on *differentiation*

- Make an upscale product at a lower cost
- Give customers more value for the money

Objectives

- Deliver superior value by **meeting or exceeding** buyer expectations on product attributes and **beating** their price expectations
- Be the low-cost provider of a product with **good-to-excellent** product attributes, then use cost advantage to **underprice** comparable brands

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How a Best-Cost Strategy Differs from a Low-Cost Strategy

Aim of a low-cost strategy -- Achieve lower costs than any other competitor in the industry

Intent of a best-cost strategy -- Make a more upscale product at lower costs than the makers of other brands with **comparable features and attributes**

A best-cost provider cannot be the industry's absolute low-cost leader because of the added costs of incorporating the additional upscale features and attributes that the low-cost leader's product doesn't have



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Competitive Strength of a Best-Cost Provider Strategy



A best-cost provider's **competitive advantage** comes from **matching** close rivals on key product attributes and **beating** them on price

Success depends on having the skills and capabilities to **provide attractive performance and features at a lower cost than rivals**

A best-cost producer can often **out-compete** both a low-cost provider and a differentiator when

- Standardized features/attributes won't meet the diverse needs of buyers
- Many buyers are price and value sensitive

Risk of a Best-Cost Provider Strategy

Risk – A **best-cost provider** may get **squeezed** between strategies of firms using **low-cost** and **differentiation** strategies

Low-cost leaders may be able to siphon customers away with a **lower price**

High-end differentiators may be able to steal customers away with **better product attributes**

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Focus / Niche Strategies

Involve **concentrated** attention on a **narrow** piece of the total market

Objective

Strategic Business Analysis

Serve niche buyers **better** than rivals

Keys to Success

- Choose a market niche where buyers have distinctive preferences, special requirements, or unique needs
- Develop unique capabilities to serve needs of target buyer segment

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Focus / Niche Strategies and Competitive Advantage

Approach 1: Achieve **lower costs** than rivals in serving the segment -- **A low-cost strategy**

Approach 2: Offer niche buyers **something different** from rivals -- **A differentiation strategy**

Examples of Focus Strategies

eBay		Online auctions
Porsche		Sports cars
Horizon and Comair (commuter airlines)		Link major airports with small cities
Jiffy Lube International		Maintenance for motor vehicles
Bandag		Specialist in truck tire recapping

[FIVE COMPETITIVE STRATEGIES | FOCUS/NICHE STRATEGY | GOTO TOP](#)

What Makes a Niche Attractive for Focusing?

- Big enough to be profitable and offers good growth potential
- Not crucial to success of industry leaders
- Costly or difficult for multi-segment competitors to meet specialized needs of niche members
- Focuser has resources and capabilities to effectively serve an attractive niche
- Few other rivals are specializing in same niche
- Focuser can defend against challengers via superior ability to serve niche members

Risks of a Focus Strategy

- Competitors find effective ways to match a focuser's capabilities in serving niche

- Niche buyers' preferences shift towards product attributes desired by majority of buyers - niche becomes part of overall market
- Segment becomes so attractive it becomes crowded with rivals, causing segment profits to be splintered

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Cooperative Strategies



Companies sometimes use **strategic alliances** or **collaborative partnerships** to complement their own strategic initiatives and strengthen their competitiveness. Such cooperative strategies go beyond normal company-to-company dealings but fall short of merger or formal joint venture.

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Why Cooperative Strategies Are Integral to a Firm's Competitiveness



- ▶ Collaborative arrangements can help a company lower its costs or gain access to needed expertise and capabilities
- ▶ Firms often lack the resources and competitive skills to be successful in very demanding competitive races
 - ▶ Allies can be useful in helping a company establish a stronger presence in global markets and helping it win the race for global market leadership
 - ▶ Allies with competitively useful technological know-how or expertise can greatly aid a company racing against rivals for leadership in the "industries of the future" now being created by today's technological and information age revolution
- ▶ Collaborative arrangements with foreign partners can be very helpful in pursuing opportunities in unfamiliar national markets

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Competitive Value of Strategic Alliances to the Partners

- Capacity of partners to defuse organizational frictions
- Ability to collaborate effectively over time and work through challenges
 - Technological and competitive surprises
 - New market developments
 - Changes in their own priorities and competitive circumstances
- Competitive advantage emerges when a company acquires valuable capabilities via alliances it could not obtain on its own, providing an edge over rivals

Why are Strategic Alliances Formed?

- To collaborate on technology development or new product development
- To fill gaps in technical or manufacturing expertise
- To acquire new competencies
- To improve supply chain efficiency
- To gain economies of scale in production and/or marketing
- To acquire or improve market access via joint marketing agreements



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Potential Benefits of Alliances to Achieve Global and Industry Leadership



- Get into critical country markets quickly to accelerate process of building a global presence
- Gain inside knowledge about unfamiliar markets and cultures
- Access valuable skills and competencies concentrated in particular geographic locations
- Establish a beachhead for participating in target industry
- Master new technologies and build new expertise faster than would be possible internally
- Open up expanded opportunities in target industry by combining firm's capabilities with resources of partners

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Why Alliances Fail

Ability of an alliance to endure depends on

- How well partners work together
- Success of partners in responding and adapting to changing conditions
- Willingness of partners to renegotiate the bargain



Reasons for alliance failure include

- Diverging objectives and priorities of partners
- Inability of partners to work well together
- Emergence of more attractive technological paths
- Marketplace rivalry between one or more allies

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Merger and Acquisition Strategies

Merger - Combination and pooling of equals, with newly created firm often taking on a new name

Acquisition - One firm, the acquirer, purchases and absorbs operations of another, the acquired



Merger-acquisition

- Much-used strategic option
- Especially suited for situations where alliances do not provide a firm with needed capabilities or cost-reducing opportunities
- Ownership allows for tightly integrated operations, creating more control and autonomy than alliances

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Benefits of Mergers and Acquisitions

Combining operations may result in :

- More or better competitive capabilities
- More attractive line-up of products / services
- Wider geographic coverage
- Greater financial resources to invest in R&D, add capacity, or expand
- Cost-saving opportunities
- Filling in of resource or technological gaps
- Stronger technological skills
- Greater ability to launch next-wave products / services



Pitfalls of Mergers and Acquisitions

Combining operations may result in :



- Resistance from rank-and-file employees
- Hard-to-resolve conflicts in management styles and corporate cultures
- Tough problems in combining and integrating the operations of the once-different companies
- Greater-than-anticipated difficulties in
 - Achieving expected cost-savings
 - Sharing of expertise
 - Achieving enhanced competitive capabilities

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Vertical Integration Strategies

- Vertical integration extends a firm's competitive scope within same industry
 - Backward into sources of supply
 - Forward toward end-users of final product
- Can aim at either full or partial integration



Competitive Strategy Principle

A vertical integration strategy has appeal **only** if it significantly strengthens a firm's competitive position!

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Strategic Advantages of Backward Integration

- Generates cost savings only if volume needed is big enough to capture efficiencies of suppliers
- Potential to reduce costs exists when
 - Suppliers have sizable profit margins
 - Item supplied is a major cost component
 - Resource requirements are easily met
- Can produce a differentiation-based competitive advantage when it results in a better quality part
- Reduces risk of depending on suppliers of crucial raw materials / parts / components

Strategic Advantages of Forward Integration

- Advantageous for a firm to establish its own distribution network if
 - Undependable distribution channels undermine steady production operations
- Lacking a broad enough product line to justify integrating forward into stand-alone distributorships or retail outlets, a firm may sell directly to end users
- Direct sales and Internet retailing may
 - Lower distribution costs
 - Produce a relative cost advantage over rivals
 - Enable lower selling prices to end users

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Strategic Disadvantages of Vertical Integration

- Boosts resource requirements
- Locks firm deeper into same industry
- Results in fixed sources of supply and less flexibility in accommodating buyer demands for product variety
- Poses problems of balancing capacity at each stage of value chain
- May require radically different skills / capabilities
- Reduces manufacturing flexibility, lengthening design time and ability to introduce new products

[VERTICAL INTEGRATION STRATEGIES](#) | [GOTO TOP](#)

Pros and Cons of Integration vs. De-Integration

Whether **vertical integration** is a viable or attractive strategy depends on

- How much it can lower cost, build expertise, increase differentiation, or otherwise **enhance performance** of strategy-critical activities
- Its **impact** on investment cost, flexibility, and administrative overhead
- The contribution it makes to strengthening a company market position or helping it create **competitive advantage**



Many companies are finding that **de-integrating, unbundling, and out-sourcing** value chain activities are a better strategic option when it comes to lowering cost, improving their competitiveness, or gaining added operating flexibility

Unbundling and Outsourcing Strategies

CONCEPT : **De-Integration** or **unbundling** involves narrowing the scope of the firm's operations, **focusing** on performing certain “core” value chain activities and **relying on outsiders** to perform the remaining value chain activities

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When Does Outsourcing Make Strategic Sense?

- Activity can be performed better or more cheaply by outside specialists
- Activity is not crucial to achieve a sustainable competitive advantage
- Risk exposure to changing technology and/or changing buyer preferences is reduced
- Operations are streamlined to
 - Cut cycle time
 - Speed decision-making
 - Reduce coordination costs
- Firm can concentrate on doing those “core” value chain activities that best suit its resource strengths and capabilities

Strategic Advantages of Outsourcing

- Improves firm's ability to obtain high quality and/or cheaper components or services
- Improves firm's ability to innovate by interacting with “best-in-world” suppliers
- Enhances firm's flexibility should customer needs and market conditions suddenly shift
- Increases firm's ability to assemble diverse kinds of expertise speedily and efficiently
- Allows firm to concentrate its resources on performing those activities internally which it can perform better than outsiders

Pitfalls of Outsourcing

Farming out **too many** or the **wrong activities**, thus

- **Hollowing out** its capabilities



- **Losing touch** with activities and expertise that determine its overall long-term success

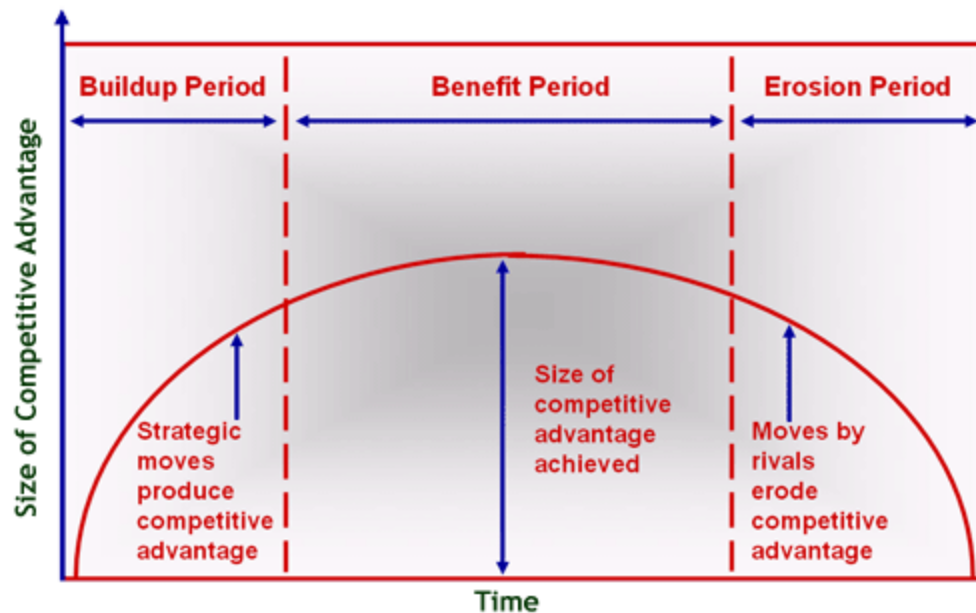
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Offensive and Defensive Strategies



- ▶ **Offensive Strategies:** Used to build new or stronger market position and/or create competitive advantage
- ▶ **Defensive Strategies:** Used to protect competitive advantage (rarely are they the basis for creating advantage)

Figure 5.3: The Building and Eroding of Competitive Advantage



Competitive Strategy Principle

Any competitive advantage currently held will **eventually be eroded** by the actions of competent, resourceful competitors !

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Options for Mounting Strategic Offensives

1. Initiatives to match or exceed competitor strengths
2. Initiatives to capitalize on competitor weaknesses
3. Simultaneous initiatives on many fronts
4. End-run offensives
5. Guerrilla warfare tactics
6. Preemptive strikes



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Attacking Competitor Strengths

Objectives

- Whittle away at a rival's competitive advantage
- Gain market share by out-matching strengths of weaker rivals

Challenging strong competitors with a lower price is foolhardy unless the aggressor has a **cost advantage** or advantage of **greater financial strength**!

Options for Attacking a Competitor's Strengths



- Offer equally good product at a lower price
- Develop low-cost edge, then use it to under-price rivals
- Leapfrog into next-generation technologies
- Add appealing new features
- Run comparison ads
- Construct new plant capacity ahead of the rival or in the rival's market strongholds
- Offer a wider product line
- Develop better customer service capabilities

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Attacking Competitor Weaknesses

Objective

Concentrate company strengths and resources directly against a rival's weaknesses

Weaknesses to Attack

Go after

- Those customers a rival has that it is least equipped to serve
- Rivals providing sub-par customer service
- Rivals with weaker marketing skills
- Geographic regions where rival is weak
- Segments rival is neglecting



[OFFENSIVE AND DEFENSIVE STRATEGIES](#) | [GOTO TOP](#)

Launching Simultaneous Offensives on Many Fronts



Objective

Launch several major initiatives to

- Throw rivals off-balance
- Splinter their attention
- Force them to use substantial resources to defend their position

Appeal

A challenger with superior resources can overpower weaker rivals by out-competing them across-the-board long enough to become a market leader.

End-Run Offensives

- Dodge head-to-head confrontations that escalate competitive intensity or risk cutthroat competition
- Attempt to maneuver around strong competitors—concentrate on areas of market where competition is weakest

Optional Approaches for End-Run Offensives

- Introduce new products that redefine market and terms of competition
- Build presence in geographic areas where rivals have little presence
- Create new segments by introducing products with different features to better meet buyer needs
- Introduce next-generation technologies to leapfrog rivals

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Guerrilla Offenses

Approach

Use principles of surprise and hit-and-run to attack in locations and at times where conditions are most favorable to initiator

Appeal

Well-suited to small challengers with limited resources and market visibility

Options for Guerrilla Offenses

- Make random, scattered raids on leaders' customers
 - Occasional low-balling on price
 - Intense bursts of promotional activity
 - Special campaigns to attract buyers from rivals plagued with a strike or having problems meeting delivery schedules
- Challenge rivals encountering problems with quality, meeting delivery times, or providing adequate technical support
- File legal actions charging antitrust violations, patent infringements, or unfair advertising

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Preemptive Strikes

Approach : Involves moving **first** to secure an advantageous position that rivals are foreclosed or discouraged from duplicating!

Preemptive Strike Options

- Acquire firm which has exclusive control of a valuable technology
- Secure exclusive/dominant access to best distributors
- Tie up best or most sources of essential raw materials
- Secure best geographic locations
- Obtain business of prestigious customers
- Expand capacity ahead of demand in hopes of discouraging rivals from following suit
- Build an image in buyers' minds that is unique or hard to copy

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Choosing Who to Attack

Four types of firms can be the target of an fresh offensive

- Market leaders
- Runner-up firms
- Struggling rivals on verge of going under
- Small local or regional firms not doing a good job for their customers



Offensive Strategy and Competitive Advantage

Strategic offensive offering strongest basis for **competitive advantage** usually entail

- Developing lower-cost product design
- Making changes in production operations that lower costs or enhance differentiation
- Developing product features that deliver superior performance or lower users' costs
- Giving more responsive customer service
- Escalating marketing effort
- Pioneering a new distribution channel
- Selling direct to end-users

Offensive Strategy Principle

The chances for a successful offensive initiative are improved when it is based on a company's resource strengths and strongest competencies and capabilities!

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Defensive Strategy

Objectives

- Fortify firm's present position

- Help sustain any competitive advantage held
- Lessen risk of being attacked
- Blunt impact of any attack that occurs
- Influence challengers to aim attacks at other rivals

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Defensive Strategies: Approaches

Approach 1: Block avenues open to challengers

Approach 2: Signal challengers that vigorous retaliation is likely

Block Avenues Open to Challengers

- Participate in alternative technologies
- Introduce new features, add new models, or broaden product line to close gaps rivals may pursue
- Maintain economy-priced models
- Increase warranty coverage
- Offer free training and support services
- Reduce delivery times for spare parts
- Make early announcements about new products or price changes
- Challenge quality or safety of rivals' products using legal tactics
- Sign exclusive agreements with distributors

Signal Challengers Retaliation Is Likely

- Publicly announce management's strong commitment to maintain present market share
- Publicly announce plans to put adequate capacity in place to meet forecasted demand
- Give out advance information about new products, technological breakthroughs, and other moves
- Publicly commit firm to policy of matching prices and terms offered by rivals
- Maintain war chest of cash reserves
- Make occasional counter-response to moves of weaker rivals

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First-Mover Advantages and Disadvantages

Advantages

When to make a strategic move is often as crucial as **what** move to make

- ▶ First-mover advantages arise **when**
 - ◆ Pioneering helps build firm's image and reputation
 - ◆ Early commitments to new technologies, new-style components, and distribution channels can produce cost advantage
 - ◆ Loyalty of first time buyers is high
 - ◆ Moving first can be a preemptive strike

Disadvantages

Moving early can be a **disadvantage** (or fail to produce an advantage) **when**

- Costs of pioneering are sizable and loyalty of first time buyers is weak
- Innovator's products are primitive, not living up to buyer expectations
- Rapid technological change allows followers to leapfrog pioneers

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Timing and Competitive Advantage

Principle 1

Being a first-mover holds potential for competitive advantage in some cases but not in others

Principle 2

Being a fast follower can sometimes yield as good a result as being a first mover

Principle 3

Being a late-mover may or may not be fatal – it varies with the situation

[FIRST MOVER ADVANTAGES AND DISADVANTAGES](#) | [GOTO TOP](#)

Lesson 6 - Strategies for Competing in Globalizing Markets

Why is the World Economy Globalizing? | Motivation for Competing Internationally? | International vs. Global Competition | Cross-Country Differences in Cultural, Demographic, and Market Conditions | Potential Locational Advantages Stemming from Cost Variations Among Countries | Differences in Host Government Trade Policies | Two Primary Patterns of International Competition | Strategy Options for International Markets | Competitive Strategy Principle | Pursuing Competitive Advantage by Competing Multinationally | What Are Profit Sanctuaries? | What is Cross-Market Subsidization? | Benefits of Strategic Alliances | Characteristics of Competing in Emerging Foreign Markets |

““You do not choose to become global.
The market chooses for you; it forces your hand.”

Alain Gomez

“... there's no purely domestic industry anymore.”

Robert Pelosky and Morgan Stanley

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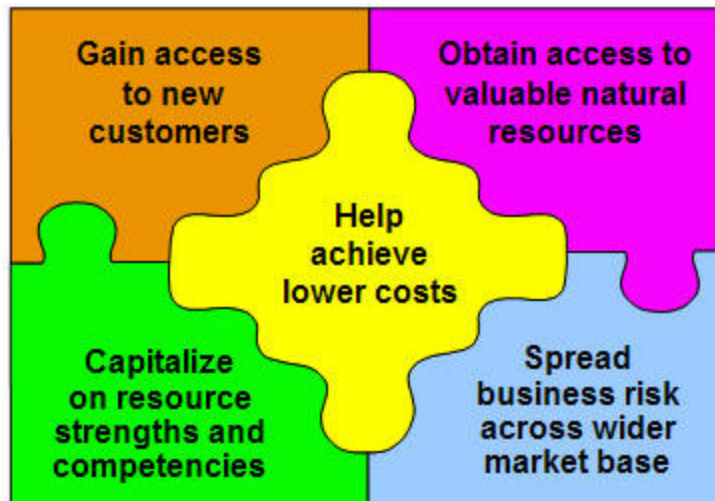
Why is the World Economy Globalizing?

- Previously closed national economies are opening up their markets to foreign companies
- Importance of geographic distance is shrinking due to the Internet
- Growth-minded companies are racing to stake out positions in the markets of more and more countries



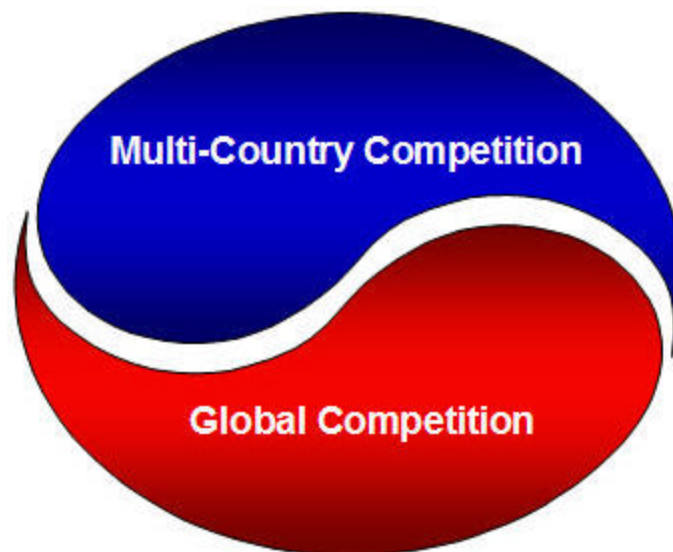
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What is the Motivation for Competing Internationally?



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International vs. Global Competition



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Cross-Country Differences in Cultural, Demographic, and Market Conditions



- Cultures and lifestyles differ among countries
- Differences in market demographics
- Variations in manufacturing and distribution costs
- Fluctuating exchange rates
- Differences in host government trade policies



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How Markets Differ from Country to Country

- Consumer tastes and preferences



- Consumer buying habits
- Market size and growth potential
- Distribution channels
- Driving forces
- Competitive pressures



One of the biggest concerns of companies competing in foreign markets is whether to customize their product offerings in each different country market to match the tastes and preferences of local buyers or whether to offer a mostly standardized product worldwide.

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Potential Locational Advantages Stemming from Cost Variations Among Countries



- Manufacturing costs vary based on ...
 - Wage rates
 - Worker productivity
 - Natural resource availability
 - Inflation rates
 - Energy costs
 - Tax rates
- Quality of a country's business environment
- Clustering of suppliers, trade associations, and makers of complementary products

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Differences in Host Government Trade Policies



- Local content requirements
- Import tariffs or quotas
- Restrictions on exports
- Regulations regarding prices of imports
- Other regulations
 - Technical standards
 - Product certification
 - Prior approval of capital spending projects
 - Withdrawal of funds from country
 - Minority ownership by local citizens



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Two Primary Patterns of International Competition



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Characteristics of Multi-Country and Global Competition

Characteristics of Multi-Country Competition	Characteristics of Global Competition
<ul style="list-style-type: none">• Each country market is self-contained• Competition in one country market is independent of competition in other country markets• Rivals competing in one country market differ from set of rivals competing in another country market• Rivals vie for national market leadership• No “international” market, just a collection of country markets	<ul style="list-style-type: none">• Competitive conditions across country markets are strongly linked together• Many of same rivals compete in many of the same country markets• Rivals vie for worldwide leadership• A true international market exists• A firm’s competitive position in one country is affected by its position in other countries• Competitive advantage (or disadvantage) is based on a firm’s world-wide operations and overall global standing

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Strategy Options for International Markets



- Exporting
- Licensing
- Franchising strategy
- Multi-country strategy
- Global strategy based on ...
 - Low cost
 - Differentiation
 - Best-cost
 - Focusing
- Strategic alliances or joint ventures



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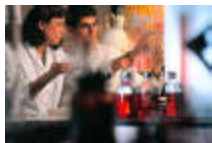
Characteristics of Export Strategies



- Involves using domestic plants as a production base for exporting to foreign markets
- Excellent initial strategy to pursue international sales
- Advantages ...
 - Minimizes both risk and capital requirements
 - Conservative way to test international waters
 - Minimizes direct investments in foreign countries
- An export strategy is vulnerable when ...
 - Manufacturing costs in home country are higher than in foreign countries where rivals have plants
 - High shipping costs are involve

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Characteristics of Licensing Strategies



- Licensing makes sense when a firm ...
 - Has valuable technical know-how or a patented product but does not have international capabilities or resources to enter foreign markets
 - Desires to avoid risks of committing resources to markets which ...
 - Are unfamiliar
 - Present economic uncertainty
 - Are politically volatile
- Disadvantage ...
 - Risk of providing valuable technical know-how to foreign firms and losing some control over its use

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Characteristics of Franchising Strategies

Often is better suited to global expansion efforts of service and retailing enterprises ...



- Advantages
 - Franchisee bears most of costs and risks of establishing foreign locations
 - Franchisor has to expend only the resources to recruit, train, and support franchisees
- Disadvantage
 - Maintaining cross-country quality control



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Multi-Country and Global Strategy

Multi-Country Strategy	Global Strategy
<p>Strategy is matched to local market needs ...</p> <ul style="list-style-type: none">• Different country strategies are called for	<p>Strategy for competing is similar in all country</p>

<p>when ...</p> <ul style="list-style-type: none">○ Significant country-to-country differences in customers' needs exist○ Buyers in one country want a product different from buyers in another country○ Host government regulations preclude uniform global approach <ul style="list-style-type: none">• Two drawbacks<ol style="list-style-type: none">1. Poses problems of transferring competencies across borders2. Works against building a unified competitive advantage	<p>markets ...</p> <ul style="list-style-type: none">• Involves ...<ul style="list-style-type: none">○ Coordinating strategic moves globally○ Selling in many, if not all, nations where a significant market exists• Works best when products and buyer requirements are similar from country to country
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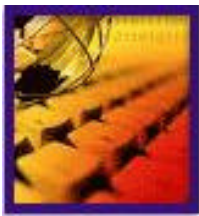
Competitive Strategy Principle

A **multi-country strategy** is appropriate for industries where multi-country competition dominates!

A **global strategy works** best in markets that are globally competitive or beginning to globalize!

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Pursuing Competitive Advantage by Competing Multinationally



Three ways to gain competitive advantage ...

1. **Locating** activities among nations to lower costs or achieve greater product differentiation
2. **Efficient/effective transfer** of competitively valuable **competencies and capabilities** from domestic to foreign markets
3. **Coordinating** dispersed activities in ways a domestic-only competitor cannot

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Locating Activities to Build a Global Competitive Advantage

Two issues ..

- Whether to ...
 - **Concentrate** each activity in a few countries or
 - **Disperse** activities to many different nations
- **Where** to locate activities -Which country is best location for which activity?



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Concentrating Activities to Build a Global Competitive Advantage

Activities should be **concentrated** when ...



- Costs of manufacturing or other value chain activities are meaningfully lower in certain locations than in others
- There are sizable scale economies in performing the activity
- There is a steep learning curve associated with performing an activity in a single location
- Certain locations have superior resources, allow better coordination of related activities, or offer other valuable advantages

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Dispersing Activities to Build a Global Competitive Advantage

Activities should be **dispersed** when ...



- They need to be performed close to buyers
- Transportation costs, scale diseconomies, or trade barriers make centralization expensive
- Buffers for fluctuating exchange rates, supply interruptions, and adverse politics are needed

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Transferring Valuable Competencies to Build a Global Competitive Advantage

Transferring competencies, capabilities, and resource strengths **across borders** contributes to ...

- Development of broader competencies and capabilities
- Achievement of dominating depth in some competitively valuable area

Dominating depth in a competitively valuable capability is a strong basis for **sustainable competitive advantage** over ...

- Other multinational or global competitors and
- Small domestic competitors in host countries



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Coordinating Cross-Border Activities to Build a Global Competitive Advantage

Aligning activities located in different countries contributes to competitive advantage in several ways ...



- Choose **where** and **how** to challenge rivals
- Shift **production** from one location to another to take advantage of most favorable cost or trade conditions or exchange rates
- Enhance brand **reputation** by incorporating same differentiating attributes in its products in all markets where it competes

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What Are Profit Sanctuaries?

- Profit sanctuaries are **country markets** where a firm ...
 - Has a **strong or protected market position** and
 - **Derives substantial profits**
- Generally, a firm's most **strategically crucial** profit sanctuary is its **home market**

Profit sanctuaries are a valuable competitive asset in global industries!



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What is Cross-Market Subsidization?

- Involves **supporting** competitive **offensives** in one market with resources/profits **diverted** from operations in other markets
- Competitive **power** of cross-market subsidization results from a multinational firm's ability to ...
 - Draw upon its organizational resources and profits in other country markets to help mount an attack on single-market or one-country rivals and try to lure away their customers with **lower prices, discount promotions, heavy advertising, or other offensive tactic**



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Achieving Global Competitiveness via Cooperation



- Cooperative agreements / strategic alliances with foreign companies are a means to ...
 - Enter a foreign market or
 - Strengthen a firm's competitiveness in world markets
- Purpose of alliances ...
 - Joint research efforts
 - Technology-sharing
 - Joint use of production or distribution facilities
 - Marketing / promoting one another's products

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Benefits of Strategic Alliances

- Gain scale economies in production and/or marketing
- Fill gaps in technical expertise or knowledge of local markets
- Share distribution facilities and dealer networks
- Direct combined competitive energies toward defeating mutual rivals
- Useful way to gain agreement on important technical standards



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Pitfalls of Strategic Alliances



- Becoming too dependent on another firm for essential expertise over the long-term
- Different motives and conflicting objectives
- Time consuming; slows decision-making
- Language and cultural barriers
- Mistrust when collaborating in competitively sensitive areas
- Clash of egos and company cultures

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Guidelines in Forming Strategic Alliances



- Pick a good partner, one that shares a common vision
- Be sensitive to cultural differences
- Recognize the alliance must benefit both sides
- Both parties have to deliver on their commitments in the agreement
- Structure decision-making process so actions can be taken swiftly when needed
- Parties must do a good job of managing the learning process, adjusting the alliance agreement over time to fit new circumstances

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Characteristics of Competing in Emerging Foreign Markets



- Tailoring products for the big, emerging markets often involves
 - Making more than minor product changes and
 - Becoming more familiar with the local cultures
- Companies have to attract buyers with bargain prices as well as better products
- Specially designed and/or specially packaged products may be needed to accommodate local market circumstances
- Management team must usually consist of a mix of expatriate and local managers

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Strategies for Local Companies in Emerging Markets

Optimal strategic approach hinges on ...

- Whether a firm's competitive assets are suitable only for the home market or can be transferred abroad
- Whether industry pressures to move toward global competition are strong or weak



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Strategy Options for Local Companies in Competing Against Global Challengers



Source: Adapted from Nitroj Dawar & Tony Frost, "Competing with Giants: Survival Strategies for Local Companies in Emerging Markets," Harvard Business Review, 77 No. 1 (Jan.-Feb. 1999), p. 122

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Lesson 7 - Business Models & Strategies for the Internet Era

The Internet : A Revolutionary Driving Force | Internet Technology | Suppliers of Internet Technology and Services | The Impact of Vigorous Competition Among Alternative Internet Technologies | How Internet Technology Impacts Company Value Chain Efficiency | How Internet Technology Can Revamp Company Value Chains | How the Internet Reshapes the Competitive Environment | Other Strategy-Shaping Features of Internet Technology | Difficulty of Relying on Internet Technology to Gain Competitive Advantage | The First Mover Advantage Myth | Strategic Mistakes Made by Early Internet Entrepreneurs | E-Commerce Business Models and Strategies for the Future | Advantages of Different Internet Positioning Options |

“The key question is not whether to deploy Internet technology -
companies have no choice if they want to stay competitive -
but how to deploy it.”

Michael Porter Professor, Harvard Business School

“Our strategy is to integrate the Internet into all of our core businesses.”

Thomas Middelhoff CEO, Bertelsmann, AG, Germany

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The Internet : A Revolutionary Driving Force

- Adds an important new distribution channel
- An important technological tool for performing some value chain activities better and for bypassing others
- Alters the strength of competitive forces
- Spawns entirely new industries
- Affects a company's competitiveness vis-à-vis rivals



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Internet Technology



Internet consists of ...

- Integrated network of users' connected computers
- Banks of servers and high-speed computers
- Digital switches and routers
- Telecommunications equipment and lines

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Suppliers of Internet Technology and Services

- Makers of specialized communications components and equipment
- Providers of Internet communications services
- Suppliers of computer components and hardware
- Developers of specialized software
- E-commerce enterprises
 - Business-to-business merchants
 - Business-to-consumer merchants
 - Media companies
 - Content providers



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The Impact of Vigorous Competition Among Alternative Internet Technologies



- Often, competing technologies have materially different pluses and minuses
- Competing technologies may well be incompatible, preventing users of one from interfacing with users of another—and costs of parallel systems may be prohibitive
- Strategic options for technology rivals:
 - Invest aggressively in R&D to win technology race
 - Form strategic alliances to build consensus for the favored technological approach
 - Acquire other companies with complementary technological expertise
 - Hedge the company's bets by investing resources in more than one of the competing technologies

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How Internet Technology Impacts Company Value Chain Efficiency

Companies can use the Internet and Internet technologies to improve the efficiency and effectiveness of particular value chain activities ...

- Powerful tool for better supply chain management
- Internal operations - just-in-time inventory, gear production schedules and production quantities to buyer orders, more accurate monitoring of buyer preferences and shifts in demand
- Collaborative data sharing with distribution channel partners - online systems reduce transactions costs



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How Internet Technology Can Revamp Company Value Chains

Internet technologies allow some value chain activities to be bypassed entirely ...

- Some manufacturers can build-to-order and sell direct (thus eliminating traditional wholesalers and brick-and-mortar retailers)
- Online systems facilitate build-to-order instead build-for-dealer inventory

The benefits of Internet technology are pervasive, spawning fundamental changes



in the ways business is conducted internally and with suppliers, wholesalers, retailers, and end-users.

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How the Internet Reshapes the Competitive Environment

The Impact on Competitive Rivalry



- Use of Internet widens a firm's geographic market reach
- Rivalry is often increased by freshly launched e-commerce initiatives of existing rivals
- Rivalry is often increased by entry of enterprising dot-com rivals with sell-direct strategies
- Rivalry is often increased when an industry consists of online sellers against pure brick-and-mortar sellers against combination brick-and-click sellers



The Impact on Barriers to Entry

- Entry barriers into e-commerce are often relatively low
 - Can be easy for new dot-coms to gain entry into some businesses
 - Can be easy for many existing firms to expand into new geographic markets via online sales

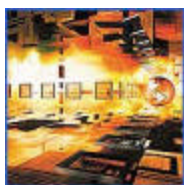
When the Internet lowers an industry's barriers to entry, the outcome is nearly always heightened competition and stronger competitive pressures for industry participants to contend with

The Impact on Buyer Bargaining Power



- Use of Internet allows buyers to gather extensive information about competing products and brands
- Buyers can readily use the Internet to "shop the market" for the best deal
- Buyer efforts to seek out the best deal spur competition among rival sellers to provide the best deal
- Internet makes it easier for buyers to join buying groups and pool their purchases to negotiate better terms and conditions

Overall impact of Internet is to increase buyer bargaining power (or at least to make buyers wiser and more informed)



Impact on Supplier Bargaining Power and Supplier-Seller Collaboration

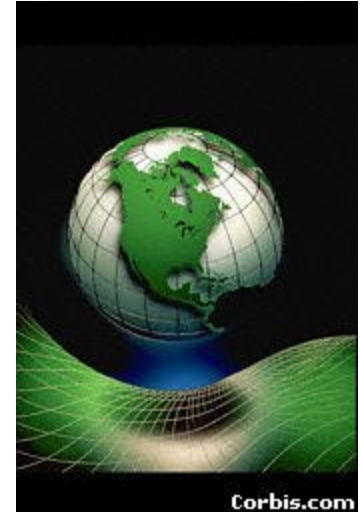
- Helps companies extend geographic reach for the best suppliers
 - Sometimes via online marketplaces or "e-markets"
- Helps companies collaborate closely with suppliers across a wide front—fosters long-term partnerships with key suppliers

Impact on bargaining power is unclear - can enhance or diminish bargaining power depending on specific circumstances - have to assess case-by-case

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Other Strategy-Shaping Features of Internet Technology

- Internet is a force for globalizing competition
- Internet and PC technologies are advancing at uncertain speeds and in sometimes unexpected directions
- Internet technologies tend to reduce variable/incremental costs and tilt the cost structure more toward fixed costs
 - Some Internet-related businesses have high fixed cost/low variable cost structure, which accounts for heavy losses until sales volume builds significantly
- Internet results in much faster diffusion of new technology and new ideas across the world
- Widespread adoption of Internet technology puts companies under the gun to move swiftly - "at Internet speed"
- The Internet can be an economical means of delivering customer service
- The capital for funding new e-businesses is available for ventures with solidly attractive business models and has dried up for ventures with dubious prospects



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Difficulty of Relying on Internet Technology to Gain Competitive Advantage



- All companies are rapidly gaining experience in use and application of Internet technology
 - Mostly with use of generic, off-the-shelf software packages readily available to rivals
 - Most industry participants gravitate to use of many of the same Internet technology applications (and achieving comparable operating benefits)
- Achieving sustainable competitive advantage generally requires use of proprietary Internet technology not readily available to rivals

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The First Mover Advantage Myth

Early Internet businesses failed to capture a durable competitive edge over "late-moving" rivals because ...

- User/buyer switching costs to visit/patronize new sites of competitors are very low (not high as some once believed)
- Network effects (where a site's features became more valuable as more people use them) have proven comparatively weak in blocking competition from rivals and discouraging Internet users from using multiple networks



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Strategic Mistakes Made by Early Internet Entrepreneurs

- The mistake of ignoring low barriers to entry ...
 - Eager capital providers paved the way for market overcrowding and fierce rivalry
- The mistake of competing solely on the basis of low price ...
 - Price became the predominant attention-getting competitive variable—price war atmosphere turned into a battle for market share and profits later (when volume built to levels high enough to support fixed costs)
 - Low price is not a competitive advantage unless it is accompanied by truly lower costs
- The mistake of selling below cost and trying to make it up with revenues from other sources (selling site ads, charging partners for click-throughs to their site, selling data on visitor browsing patterns)
 - Foolish to employ price discounting without offsetting cost advantage
 - Makes firm reliant on ever-rising ad revenues to offset losses from growing unit sales volumes below cost
 - Ignores strong bargaining power of Internet advertisers



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E-Commerce Business Models and Strategies for the Future



Three basic options ...

- A “pure” dot-com strategy
- Combination brick-and-click strategies
- A traditional business that only uses Internet technology to improve operational effectiveness and value chain efficiency

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Business Models and Strategies for “Pure” Dot-Com Enterprises

Successful dot-com strategies tend to incorporate the following features:

- A distinctive strategy that delivers unique value to buyers and makes buying online very appealing
- Deliberate efforts to engineer a value chain that enables differentiation or lower costs or better value for the money
- Focusing on a limited number of competencies and performing a specialized number of value chain activities where proprietary Internet applications and capabilities can be developed
- Having strong capabilities in cutting-edge Internet technology
- Using innovative marketing techniques that are efficient in reaching the targeted audience and effective in stimulating purchases (or help boost ancillary revenues like advertising)
- Minimal reliance on ancillary for bottom-line profitability
- Keeping the Web site fresh, user-friendly (Southwest Airlines), and often entertaining (eBay) or innovative (audio, video, appealing to eye, interesting content)



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Issues for “Pure” Dot-Com Enterprises



- Broad versus narrow product lines
 - One-stop shopping (Amazon.com, eBay) or a classic focus strategy (eToys)
- Whether to outsource order fulfillment to specialists or handle it internally
- Whether to employ unconventional business models and strategies
 - Yahoo!—rely heavily on advertising
 - Provide information for a fee
 - Pay per use (software, video games)
 - Priceline.com

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Brick-and-Click Strategies: An Appealing Middle Ground Strategy



- Gives customers the option of shopping online or in stores
- Effective when customers want to see or inspect before purchasing
- Effective when customers want to do some part of their business in person and some online (banking)
- Many brick-and-mortar enterprises can enter online retailing at relatively low costs (a web site and systems for filling and delivering customer orders)
 - Web ordering can enhance the value of local stores because they can be used as local stocking and delivery/pick-up points (Office Depot) - eliminates the need for picking, packing, and shipping from a central warehouse

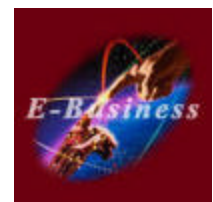
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Internet Strategies for Traditional Businesses

Few, if any, businesses can/should avoid making use of Internet technology to squeeze out internal cost savings and improve operational effectiveness

Key issue is how to use the Internet to position the company in the marketplace

- Use Internet as ...
 - company's **exclusive** distribution channel
 - **primary** channel
 - **one of several** important channels
 - **secondary** or minor channel
 - **Solely as a vehicle for disseminating product information** (with traditional distribution channel partners making all sales to end-users)



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Advantages of Different Internet Positioning Options



Advantage of operating a website that provides existing and potential customers with extensive information:

Avoids channel conflict and angering longtime wholesale/retail dealers

- Important where strong support and goodwill of dealer networks is essential

Advantage of using online sales as a secondary/minor distribution channel:

Helps a company gain online experience, achieve incremental sales, and do marketing research to respond more precisely to buyer preferences

- Unlikely to provoke much outcry from dealers

Advantages of employing a brick-and-click strategy to sell direct to end-users and compete directly with traditional wholesalers and retailers: *Cuts out costs of wholesalers/retailers, enhances profit margins, may give customers quicker product access (software), helps educate buyers to the advantages of buying online*

- Sell-direct positioning is worth the risks of channel conflict when online sales may evolve into the firm's *primary* distribution channel

Advantage of bypassing traditional distribution channels entirely: *Allows capture of full retail price by the manufacturer (downloads of music) and more economical build-to-order manufacturing and assembly (Dell Computer)*

- Revamped value chain may allow for price reductions and minimal reliance on sales through distribution allies

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Lesson 8 - Tailoring Strategy to Fit Company Situations

| Strategies for Emerging Industries | Strategies for Turbulent, High Velocity Markets | Strategies for Maturing Industries | Strategies for Declining Industries | Strategies for Fragmented Industries | Strategies for Sustaining Rapid Growth | Strategies for Industry Leaders | Strategies for Runner-up Firms | Strategies for Weak Businesses | Ten Commandments for Crafting Strategies |

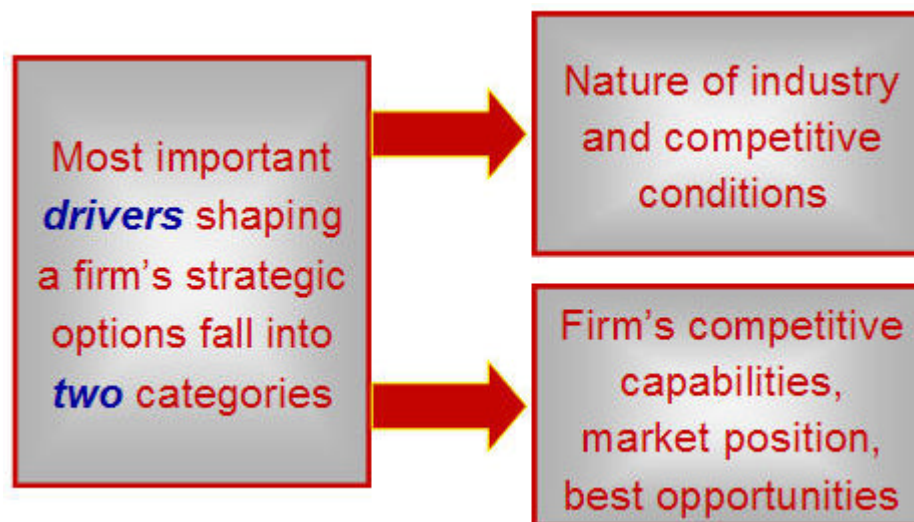
“Competing in the marketplace is like war.

You have injuries and casualties, and the best strategy wins.”

John Collins

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Overview: Matching Strategy to a Company's Situation



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Features of an Emerging Industry



- New and unproven market
- Proprietary technology
- Low entry barriers
- Experience curve effects may permit cost reductions as volume builds
- Buyers are first-time users
- Marketing involves inducing initial purchase and overcoming customer concerns
- Possible difficulties in securing raw materials
- Firms struggle to fund R&D, operations and build resource capabilities for rapid growth

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Strategy Options for Competing in Emerging Industries

- Win early race for industry leadership by employing a **bold, creative** strategy
- Push hard to perfect **technology**, improve product **quality**, and develop attractive **performance features**
- **Move quickly** when technological uncertainty clears and a **dominant technology** emerges
- Form **strategic alliances** with ...
 - Key suppliers
 - Companies having related technological expertise
- Capture potential **first-mover** advantages
- Pursue ...
 - **New customers** and **user applications**
 - Entry into **new geographical** areas
- Focus **advertising** emphasis on ...
 - Increasing frequency of use
 - Creating brand loyalty
- Use **price cuts** to attract price-sensitive buyers



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Features of High Velocity Markets



- Rapid-fire technological change
- Short product life-cycles
- Rapidly evolving customer expectations
- Frequent launches of new competitive moves
- Entry of important new rivals

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Meeting the Challenge of High-Velocity Change



Source: Adapted from Shona L. Brown and Kathleen M. Eisenhardt, *Competing on the Edge: Strategy as Structured Chaos* (Boston, MA: Harvard Business School Press, 1998) p. 5.

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Strategy Options for Competing in High Velocity Markets

- Invest aggressively in R&D
- Develop quick response capabilities

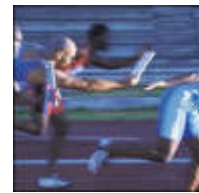


- Shift resources
- Adapt competencies
- Create new competitive capabilities
- Speed new products to market
- Use strategic partnerships to develop specialized expertise and capabilities
- Initiate fresh actions every few months
- Keep products/services fresh and exciting

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Keys to Success in Competing in High Velocity Markets

- Cutting-edge expertise
- Speed in responding to new developments
- Collaboration with others
- Agility
- Innovativeness
- Opportunism
- Resource flexibility
- First-to-market capabilities



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Characteristics of Industry Maturity

- Slowing demand breeds stiffer competition
- More sophisticated buyers demand bargains
- Greater emphasis on cost and service
- “Topping out” problem in adding production capacity
- Product innovation and new end uses harder to come by
- International competition increases
- Industry profitability falls
- Mergers and acquisitions reduce the number of industry rivals



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Strategy Options for Competing in a Mature Industry



- Prune marginal products and models
- Emphasize **innovation** in the **value chain**
- Strong focus on **cost reduction**
- **Increase sales** to present customers
- **Purchase rivals** at bargain prices
- Expand **internationally**
- Build new, more **flexible competitive capabilities**

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Strategic Pitfalls in a Maturing Industry

- Employing a ho-hum strategy with no distinctive features thus leaving firm “**stuck**”

in the middle”

- **Concentrating** on **short-term** profits rather than strengthening long-term competitiveness
- **Being slow** to **adapt** competencies to changing customer expectations
- **Being slow** to respond to **price-cutting**
- **Having** too much **excess capacity**
- **Overspending** on **marketing**
- **Failing** to pursue **cost reductions** aggressively



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Stagnant or Declining Industries: The Standout Features

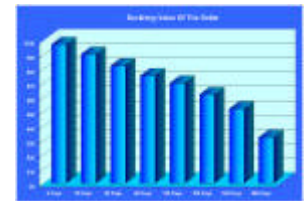
- Demand grows more slowly than economy as whole (or even declines)
- Competitive pressures intensify—rivals battle for market share
- To grow and prosper, firm must take market share from rivals
- Industry consolidates to a smaller number of key players via mergers and acquisitions



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Strategy Options for Competing in a Stagnant or Declining Industry

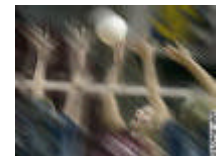
- Pursue **focus strategy** aimed at fastest growing market segments
- Stress **differentiation** based on quality improvement or product innovation
- Work diligently to **drive costs down ...**
 - Cut marginal activities from value chain
 - Use outsourcing
 - Redesign internal processes to exploit e-commerce
 - Consolidate under-utilized production facilities
 - Add more distribution channels
 - Close low-volume, high-cost distribution outlets
 - Prune marginal products



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Competing in a Stagnant Industry: The Strategic Mistakes

- Getting embroiled in a profitless battle for market share with stubborn rivals
- Diverting resources out of the business too quickly
- Being overly optimistic about industry's future (believing things will get better)



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Competitive Features of Fragmented Industries

- Absence of market leaders with large market shares
- Buyer demand is so diverse and geographically scattered that many firms are required to satisfy buyer needs
- Low entry barriers
- Absence of scale economies
- Buyers require small amounts of customized or made-to-order products



- Market for industry's product/service may be globalizing, thus putting many companies across the world in same market arena
- Exploding technologies force firms to specialize just to keep up in their area of expertise
- Industry is young and crowded with aspiring contenders, with no firm having yet developed recognition to command a large market share

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Examples of Fragmented Industries



- Book publishing
- Landscaping and plant nurseries
- Auto repair
- Restaurant industry
- Public accounting
- Women's dresses
- Meat packing
- Paperboard boxes
- Hotels and motels
- Furniture



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Competing in a Fragmented Industry: The Strategy Options



- Construct and operate ***"formula" facilities***
- Become a ***low-cost*** operator
- ***Specialize*** by ***product*** type
- ***Specialize*** by ***customer*** type
- Focus on ***limited geographic*** area



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Strategies for Sustaining Rapid Growth

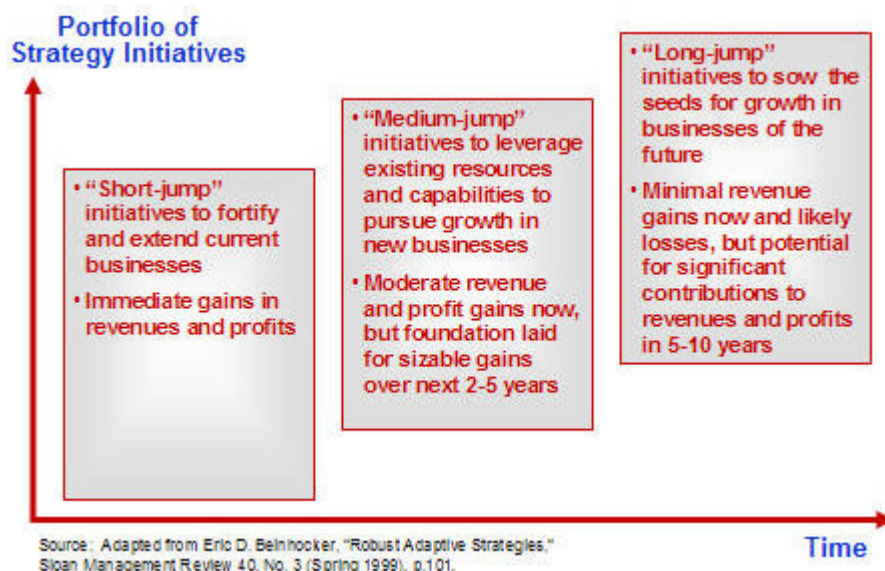
Companies desirous of growing revenues and earnings rapidly year-after-year have to have a portfolio of strategies ...



- Horizon 1: Strategic initiatives to fortify and extend their position in existing businesses
- Horizon 2: Strategic initiatives to leverage existing resources and capabilities by entering new businesses with promising growth potential
- Horizon 3: Strategic initiatives to plant new seeds for venturing into businesses that are just emerging or do not even exist yet

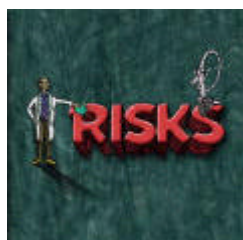
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Three Strategy Horizons for Sustaining Rapid Growth



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Risks of Pursuing Multiple Strategy Horizons



- Firm should not pursue all options to avoid stretching itself too thin
- Pursuit of medium- and long-jump initiatives may cause firm to stray too far from its core competencies
- Competitive advantage may be difficult to achieve in medium- and long-jump businesses that do not mesh well with firm's present resource strengths
- Payoffs of long-jump initiatives may prove elusive

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Strategies Based on a Company's Market Position



- Industry leaders
- Runner-up firms
- Weak or crisis-ridden firms

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Characteristics of Industry Leaders

- Stronger-than-average to powerful position
- Well-known reputation
- Proven strategies
- Strategic concern -- **How to sustain dominant leadership position**



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Strategy Options: Industry Leaders

Stay-on-the-Offensive Strategy

Fortify-and-Defend Strategy

Muscle-Flexing Strategy

Stay-on-the-Offensive Strategies

- Be a first-mover, leading industry change
- Best defense is a good offense
- Relentlessly pursue continuous improvement and innovation
- Force rivals to scramble to keep up
- Launch initiatives to keep rivals off balance
- Grow faster than industry, taking market share from rivals



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Fortify-and-Defend Strategy: Objectives

- Make it harder for new firms to enter and for challengers to gain ground
- Hold onto present market share
- Strengthen current market position
- Protect competitive advantage



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Fortify-and-Defend: Strategic Options

- Increase advertising and R&D
- Provide higher levels of customer service
- Introduce more brands to match attributes of rivals
- Add personalized services to boost buyer loyalty
- Keep prices reasonable and quality attractive
- Build new capacity ahead of market demand
- Invest enough to remain cost competitive
- Patent feasible alternative technologies
- Sign exclusive contracts with best suppliers and distributors



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Muscle-Flexing Strategy: Objectives

- Play **competitive hardball** with smaller rivals that threaten leader's position
- Signal smaller rivals that moves to cut into leader's business will be hard fought
- Convince rivals they are better off playing "follow-the-leader" or else attacking each other rather the industry leader

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Muscle-Flexing: Strategic Options

- Be quick to meet price cuts of rivals
- Counter with large-scale promotional campaigns if rivals boost advertising
- Offer better deals to rivals' major customers
- Dissuade distributors from carrying rivals' products

- Provide salespersons with documentation about weaknesses of competing products
- Make attractive offers to key executives of rivals
- Use arm-twisting tactics to pressure present customers not to use rivals' products



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Types of Runner-up Firms



- Market challengers
 - Use offensive strategies to gain market share
- Focusers
 - Concentrate on serving a limited portion of market
- Perennial runners-up
 - Lack competitive strength to do more than continue in trailing position

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Obstacles Runner-Up Firms Must Overcome

- When **big size** is a **competitive asset**, firms with **low market share** face **obstacles** ...
 - Less access to economies of scale
 - Difficulty in gaining customer recognition
 - Inability to afford mass media advertising
 - Difficulty in funding capital requirements



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Case #1: Strategic Options for Runner-Up Firms



- When **big size** provides larger rivals with a **cost advantage**, runner-up firms have two options ...
 - **Build market share**
 - Lower costs and prices to grow sales **or**
 - Out-differentiate rivals in ways to grow sales
 - **Withdraw from market**

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Competitive Strategies for Runner-Up Firms: Building Market Share

- Strategic options for building market share to overcome cost advantage of larger rivals
- Use **lower prices** to win customers from weak, higher-cost rivals
- **Merge** or **acquire rivals** to achieve size needed to capture greater scale economies
- **Invest** in new **cost-saving facilities** and **equipment**, perhaps relocating operations to countries where costs are lower
- Pursue **technological innovations** or radical **value chain revamping** to achieve cost-savings



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Strategic Options for Runner-Up Firms Not Disadvantaged By Smaller Size

Where **big size** does **not** yield a **cost advantage**, runner-up firms have seven options ...



1. Offensive strategies to build market share
2. Growth-via-acquisition strategy
3. Vacant niche strategy
4. Specialist strategy
5. Superior product strategy
6. Distinctive image strategy
7. Content follower strategy

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Strategies for Runner-Up Firms Not Disadvantaged By Smaller Size

Best “**mover-and-shaker**” offensives ...

- Pioneer a leapfrog technological breakthrough
- Get new/better products into market ahead of rivals and build reputation for product leadership
- Be more agile and innovative in adapting to evolving market conditions and customer needs
- Forge attractive strategic alliances with key distributors and/or marketers of similar products
- Find innovative ways to dramatically drive down costs to win customers from higher-cost rivals
- Craft an attractive differentiation strategy



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Rule of Offensive Strategy

Runner-up firms should avoid attacking a leader head-on with an imitative strategy, regardless of resources and staying power an underdog may have!

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Growth-via-Acquisition Strategies for Runner-Up Firms



- **Frequently used strategy** of ambitious runner-up firms
- To succeed, top managers must have skills to ...
 - Assimilate operations of acquired firms, eliminating duplication and overlap,
 - Generate efficiencies and cost savings, and
 - Structure combined resources to create stronger competitive capabilities

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Vacant Niche Strategies for Runner-Up Firms

- **Focus strategy** concentrated on end-use applications market leaders have neglected
- Characteristics of an **ideal vacant niche**
 - Sufficient size to be profitable
 - Growth potential
 - Well-suited to a firm's capabilities
 - Hard for leaders to serve



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Specialist Strategy for Runner-Up Firms



- **Strategy** concentrated on being a leader based on ...
 - Specific technology
 - Product uniqueness
 - Expertise in ...
 - Special-purpose products
 - Specialized know-how
 - Delivering distinctive customer services

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Superior Product Strategy for Runner-Up Firms

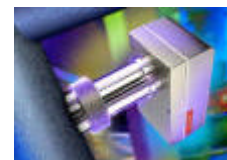


- **Differentiation-based focused strategy** based on ...
 - Superior product quality or
 - Unique product attributes
- **Approaches**
 - Fine craftsmanship
 - Prestige quality
 - Frequent product innovation
 - Close contact with customers to gain input for better quality product

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Distinctive Image Strategy for Runner-Up Firms

- **Strategy** concentrated on ways to **stand out** from rivals
- **Approaches**
 - Reputation for charging lowest price
 - Prestige quality at a good price
 - Superior customer service
 - Unique product attributes
 - New product introductions
 - Unusually creative advertising



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Content Follower Strategy for Runner-Up Firms

- **Strategy** involves avoiding
 - Trend-setting moves and



- Aggressive moves to steal customers from leaders
- **Approaches**
 - Do not provoke competitive retaliation
 - React and respond
 - Defense rather than offense
 - Keep same price as leaders
 - Attempt to maintain market position

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Weak Businesses: Strategic Options

- Launch a strategic offensive (if resources permit)
- Play aggressive defense (to the extent that resources permit)
- Pursue immediate abandonment
- Adopt an end-game strategy



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Achieving a Turnaround: The Strategic Options



- Sell off assets to generate cash and/or reduce debt
- Revise existing strategy
- Launch efforts to boost revenues
- Cut costs
- Combination of efforts

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Liquidation Strategy

- Wisest strategic option in certain situations ...
 - Lack of resources
 - Dim profit prospects
 - May serve stockholder interests better than bankruptcy
- Unpleasant strategic option ...
 - Hardship of job eliminations
 - Effects of closing on local community



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What is an End-Game Strategy?



- Steers **middle** course between status quo and exiting quickly
- Involves **gradually sacrificing market position** in return for bigger near-term cash flow/profit
- Objectives
 - **Short-term** - Generate largest feasible cash flow
 - **Long-term** - Exit market

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Types of End-Game Options



- Reduce operating budget to rock-bottom
- Hold reinvestment to minimum
- Emphasize stringent internal cost controls
- Place little priority on new capital investments
- Raise price gradually
- Trim promotional expenses
- Reduce quality in non-visible ways
- Curtail non-essential customer services
- Shave equipment maintenance

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When Should an End-Game Strategy be Considered?

- Industry's long-term prospects are unattractive
- Building up business would be too costly
- Market share is increasingly costly to maintain
- Reduced levels of competitive effort will not trigger immediate fall-off in sales
- Firm can re-deploy freed-up resources in higher opportunity areas
- Business is not a major component of diversified firm's portfolio of businesses
- Business does not contribute other desired features to overall business portfolio



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10 Commandments for Crafting Successful Business Strategies

1. Always put top priority on crafting and executing strategic moves that enhance a firm's competitive position for the long-term and that serve to establish it as an industry leader
2. Be prompt in adapting and responding to changing market conditions, unmet customer needs and buyer wishes for something better, emerging technological alternatives, and new initiatives of rivals. Responding late or with too little often puts a firm in the precarious position of playing catch-up.
3. Invest in creating a sustainable competitive advantage, for it is a most dependable contributor to above-average profitability.
4. Avoid strategies capable of succeeding only in the best of circumstances.
5. Don't underestimate the reactions and the commitment of rival firms.
6. Consider that attacking competitive weakness is usually more profitable than attacking competitive strength.
7. Be judicious in cutting prices without an established cost advantage.
8. Employ bold strategic moves in pursuing differentiation strategies so as to open up very meaningful gaps in quality or service or advertising or other product attributes.
9. Endeavor not to get "stuck back in the pack" with no coherent long-term strategy or distinctive competitive position, and little prospect of climbing into the ranks of the industry leaders.
10. Be aware that aggressive strategic moves to wrest crucial market share away from rivals often provoke aggressive retaliation in the form of a marketing "arms race" and/or price wars.

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Lesson 9 - Strategy & Competitive Advantage

|Diversification and Corporate Strategy | When to Diversify | Related vs. Unrelated Businesses | Related Diversification Strategies | Unrelated Diversification Strategies | Combination Related-Unrelated Diversification Strategies | Strategies for Entering New Businesses | Strategy Options for Diversified Companies | Strategies to Broaden a Diversified Company's Base | Divestiture Strategies | Corporate Restructuring and Turnaround Strategies | Multinational Diversification Strategies |

“. . .to acquire or not to acquire: that is the question.”

Robert J. Terry

“Fit between a parent and its businesses is a two-edged sword:
a good fit can create value; a bad one can destroy it.”

Andrew Campbell, Michael Gould, and Marcus Alexander

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Diversification and Corporate Strategy



- A company is **diversified** when it is in two or more lines of business
- **Strategy-making in a diversified company** is a **bigger** picture exercise than crafting a strategy for a single line-of-business
 - A diversified company needs a **multi-industry, multi-business strategy**
 - A **strategic action plan** must be developed for **several** different **businesses** competing in **diverse industry** environments

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Four Main Tasks in Crafting Corporate Strategy



- Pick **new industries** to enter and decide on **means of entry**
- Initiate actions to boost **combined performance** of businesses
- Pursue opportunities to **leverage cross- business value chain relationships** and **strategic fits** into competitive advantage
- Establish **investment priorities**, steering resources into most attractive business units

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Competitive Strengths of a Single Business Strategy

- Less ambiguity about “who we are”
- Energies of firm can be directed down one business path and keeping strategy responsive to industry change
- Less chance resources will be stretched thinly over too many competing

activities

- Resources can be focused on building competencies and capabilities that make the firm better at what it does
- Higher probability innovative ideas will emerge
- Top executives can maintain hands-on contact with core business
- Important competencies more likely to emerge
- Ability to parlay experience and reputation into ...
 - Sustainable competitive advantage
 - Prominent leadership position



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Risks of a Single Business Strategy



- Putting all the “eggs” in one industry basket
- If market becomes unattractive, a firm’s prospects can quickly dim
- Unforeseen changes can undermine a single business firm’s prospects
 - Changing customer needs
 - Technological innovation
 - New substitutes

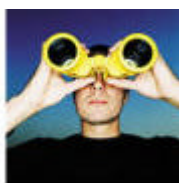
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When Does Diversification Start to Make Sense?

Strong competitive position, rapid market growth Not a good time to diversify	Weak competitive position, rapid market growth Not a good time to diversify
Strong competitive position, slow market growth Diversification is top priority consideration	Weak competitive position, slow market growth Diversification merits consideration

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When to Diversify ?



- **Diminishing growth** prospects in present business
- Opportunities to **add value** for customers or **gain competitive advantage** by broadening present business to include complementary products
- Attractive opportunities to **transfer** existing **competencies** to new businesses
- Potential **cost-saving opportunities** to be realized by entering related businesses
- **Availability** of adequate financial and organizational **resources**

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Why Diversify ?

- To build **shareholder value**
 - $1 + 1 = 3$
- Diversification is **capable** of increasing **shareholder value** if it passes three tests ...

1. Industry Attractiveness Test
2. Cost of Entry Test
3. Better-Off Test



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Strategic Management Principle

To create shareholder value,
a diversifying firm must get into businesses that can perform **better** under common management
than they could perform operating as independent stand-alone enterprises!

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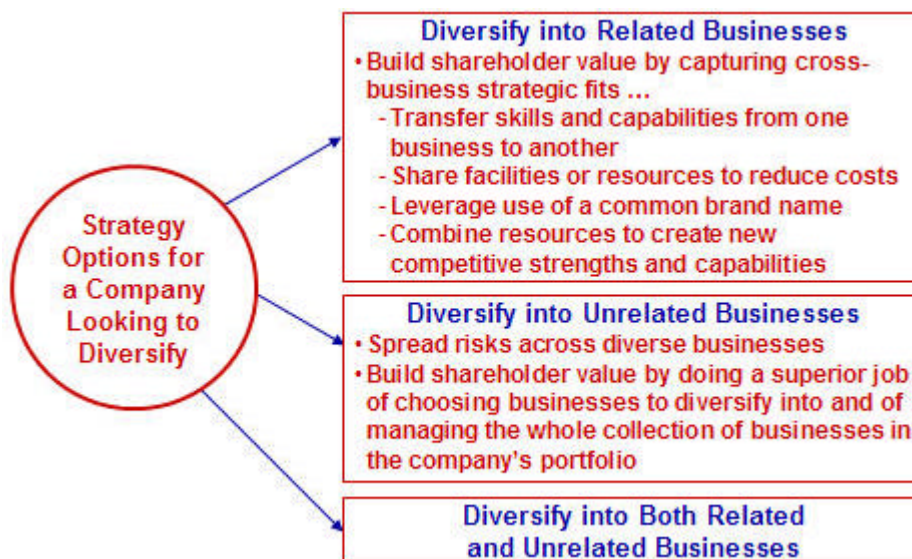
Related vs. Unrelated Diversification

Related Diversification Involves ...
diversifying into businesses whose value
chains possess competitively valuable
“strategic fits” with the value chain(s) of the
firms present business(es)

Unrelated Diversification Involves ...
diversifying into businesses where there is no
deliberate effort to seek out businesses
having strategic fit with the firm's other
business(es)

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Strategy Alternatives for a Company Looking to Diversify

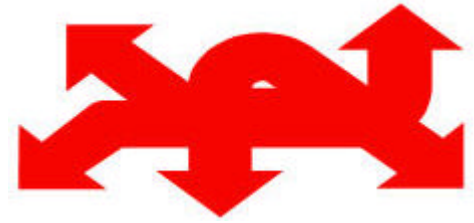


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What is Related Diversification?

- Involves diversifying into businesses whose **value chains** possess competitively valuable “**strategic fits**” with the value chain(s) of the present business(es)

- Capturing the “**strategic fits**” makes related diversification a **1 + 1 = 3** phenomenon



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Concept: Strategic Fit

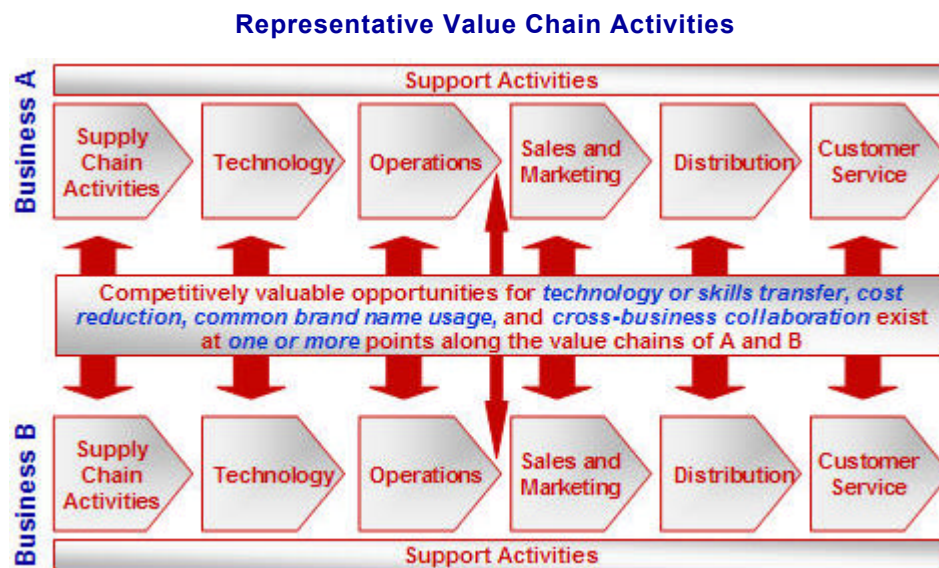
Exists whenever **one or more activities** in the **value chains** of different businesses are sufficiently **similar** to **present opportunities** for ...



- **Transferring** competitively valuable **expertise or technological** know-how from one business to another
- **Combining performance** of common value chain activities to achieve **lower costs**
- **Exploiting** use of a well-known **brand name**
- **Cross-business collaboration** to create competitively valuable **resource strengths** and **capabilities**

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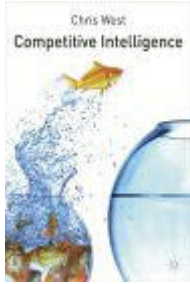
Value Chains for Related Businesses



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Strategic Appeal of Related Diversification

- Reap **competitive advantage** benefits of ...
 - Skills transfer
 - Lower costs
 - Common brand name usage
 - Stronger competitive capabilities
- **Spread** investor **risks** over a broader base
- Preserves **strategic unity** in its business activities



- Achieve **consolidated performance** greater than the sum of what individual businesses can earn operating independently

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Types of Strategic Fits

Cross-business **strategic fits** can exist anywhere along the value chain ...



- R&D and technology activities
- Supply chain activities
- Manufacturing activities
- Distribution activities
- Sales and marketing activities
- Managerial and administrative support activities

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R&D and Technology Fits



- Offer potential for sharing common technology or transferring technological know-how
- Potential benefits ...
 - Cost-savings in technology development and new product R&D
 - Shorter times in getting new products to market
 - Interdependence between resulting products leads to increased sales

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Supply Chain Fits



Offer potential opportunities for skills transfer ...

- Procuring materials
- Greater bargaining power in negotiating with common suppliers
- Benefits of added collaboration with common supply chain partners
- Added leverage with shippers in securing volume discounts on incoming parts

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Manufacturing Fits

- Potential source of competitive advantage when a diversifier's expertise can be beneficially transferred to another business ...
 - Quality manufacture
 - Cost-efficient production methods
 - Just-in-time inventory practices
 - Training and motivating workers
- Cost-saving opportunities arise from ability to perform manufacturing/assembly



activities jointly in same facility, making it feasible to ...

- Consolidate production into fewer plants
- Significantly reduce overall manufacturing costs

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Distribution Fits



- Offer potential cost-saving opportunities ...
 - Share same distribution facilities
 - Use many of the same wholesale distributors and retail dealers to access customers

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Sales and Marketing Fits: Types of Potential Benefits



- Reduction in sales costs ...
 - Single sales force for related products
 - Advertising related products together
 - Combined after-sale service and repair work
 - Joint delivery and shipping
 - Joint order processing and billing
 - Joint promotion tie-ins
- Similar sales and marketing approaches provide opportunities to transfer selling, merchandising, and advertising/promotional skills
- Transfer of a strong company's brand name and reputation

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Managerial and Administrative Support Fits



- Emerge when different business units require comparable types of ...
 - Entrepreneurial know-how
 - Administrative know-how
 - Operating know-how
- Different businesses often entail same types of administrative support facilities ...
 - Customer data network
 - Billing and customer accounting systems
 - Customer service infrastructure

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Concept: Economies of Scope

- Stem from **cross-business** cost-saving opportunities
- Arise from ability to **eliminate costs** by operating two or more businesses under same corporate umbrella
- Exist when it is **less costly** for two or more businesses to operate under centralized



management than to function independently

- **Cost saving** opportunities can stem from interrelationships anywhere along businesses' **value chains**

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Related Diversification and Competitive Advantage

Competitive advantage can result from related diversification if opportunities exist to ...



- **Transfer** expertise/capabilities/technology
- **Combine** related activities into a single operation and **reduce costs**
- **Leverage** use of firm's **brand name reputation**
- Conduct related value chain activities in a **collaborative fashion** to create valuable **competitive capabilities**

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Capturing Benefits of Strategic Fit

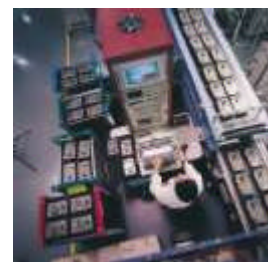
- **Benefits don't occur just because a company has diversified into related businesses !**
 - Businesses with sharing potential must be reorganized to coordinate activities
 - Means must be found to make skills transfer effective
- Benefits of some **strategic coordination** must exist to justify sacrificing business-unit autonomy
- **Competitive advantage** potential exists to ...
 - Expand resources and strategic assets and
 - Create new ones faster and cheaper than rivals



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What is Unrelated Diversification?

- Involves diversifying into businesses with ...
 - **No** strategic fit
 - **No** meaningful value chain relationships
 - **No** unifying strategic theme
- Approach is to venture into “any business in which we think we can make a profit”
- Firms pursuing unrelated diversification are often referred to as **conglomerates**

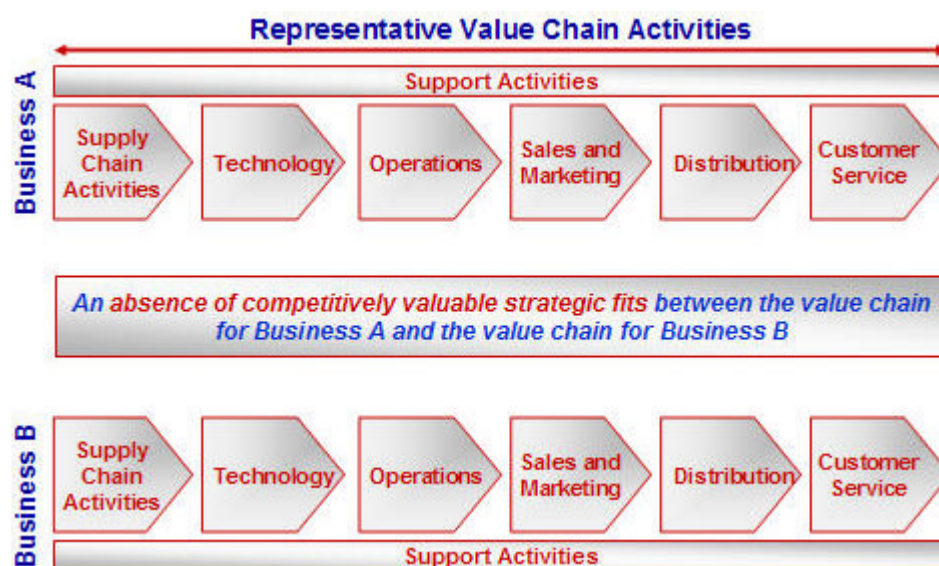


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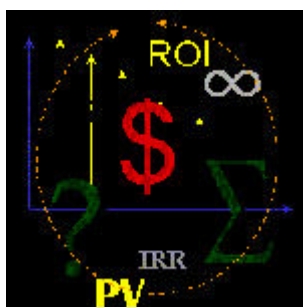
Basic Premise of Unrelated Diversification

Any company that can be acquired on good financial terms and offers good prospects for profitability is a good business to diversify into!

Value Chains for Unrelated Businesses



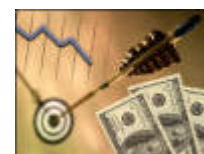
Acquisition Criteria For Unrelated Diversification Strategies



- Can business meet corporate targets for profitability and ROI?
- Will business require substantial infusions of capital?
- Is business in an industry with growth potential?
- Is business big enough to contribute to the parent firm's bottom line?
- Is there potential for union difficulties or adverse government regulations?
- Is industry vulnerable to recession, inflation, high interest rates, or shifts in government policy?

Attractive Acquisition Targets

- Companies with undervalued assets
 - Capital gains may be realized
- Companies in financial distress
 - May be purchased at bargain prices and turned around



Appeal of Unrelated Diversification



- Business risk scattered over different industries
- Financial resources can be directed to those industries offering best profit prospects
- Stability of profits – Hard times in one industry may be offset by good times in another industry
- If bargain-priced firms with big profit potential are bought, shareholder wealth can

be enhanced

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Drawbacks of Unrelated Diversification

- Difficulties of competently managing many diverse businesses
- Lack of strategic fits which can be leveraged into competitive advantage
 - Consolidated performance of unrelated businesses tends to be no better than sum of individual businesses on their own (and it may be worse)
 - Likely effect is $1 + 1 = 2$, rather than $1 + 1 = 3$
 - Promise of greater sales-profit stability over business cycles seldom realized



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How Broadly Should a Company Diversify?

Two questions should guide *unrelated diversification* efforts ...



1. What is the **least** diversification it will take to achieve acceptable growth and profitability?
2. What is the **most** diversification that can be managed, given its added complexity?

*Need to strike a balance between too few different businesses
and too many different businesses!*

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How Many Unrelated Businesses Can a Company Diversify Into?

With unrelated diversification, corporate managers have to be shrewd enough to ...

- Discern good acquisitions from bad ones
- Select capable managers to run many different businesses
- Judge soundness of strategic proposals of business-unit managers
- Know what to do if a subsidiary stumbles



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Diversification and Shareholder Value



Related Diversification

- A **strategy-driven** approach to creating shareholder value

Unrelated Diversification

- A **finance-driven** approach to creating shareholder value



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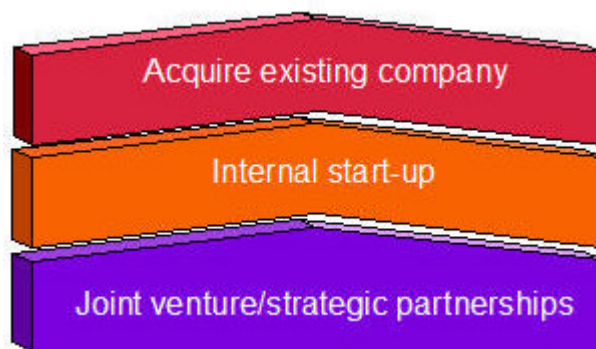
Combination Related-Unrelated Diversification Strategies

- Dominant-business firms ...
 - One major **core business** accounting for 50 - 80 percent of revenues, with several small related or unrelated businesses accounting for remainder
- Narrowly diversified firms ...
 - Diversification includes a **few** (2 - 5) related or unrelated businesses
- Broadly diversified firms ...
 - Diversification includes a **wide** ranging collection of either related or unrelated businesses or a mixture
- Multibusiness firms ...
 - Diversification portfolio includes several **unrelated groups of related businesses**



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Strategies for Entering New Businesses



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Acquisition of an Existing Company



- Most popular approach to diversification
- Advantages ...
 - Quicker entry into target market
 - Easier to hurdle certain entry barriers ...
 - Technological inexperience
 - Gaining access to reliable suppliers
 - Being of a size to match rivals in terms of efficiency and costs
 - Getting adequate distribution access

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Internal Startup

More attractive when ...

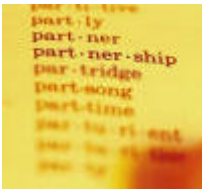
- Ample time exists to create a new business from ground up
- Incumbents slow in responding to new entry
- Less expensive than buying an existing firm
- Company already has most of needed skills
- Additional capacity will not adversely impact supply-demand balance in industry
- New start-up does not have to go head-to-head against powerful rivals



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Joint Ventures and Strategic Partnerships

Good way to diversify when ...



- Uneconomical or risky to go it alone
- Pooling competencies of two partners provides more competitive strength
- Foreign partners are needed to surmount ...
 - Import quotas
 - Tariffs
 - Nationalistic political interests
 - Cultural roadblocks
 - Lack of knowledge about markets of particular countries

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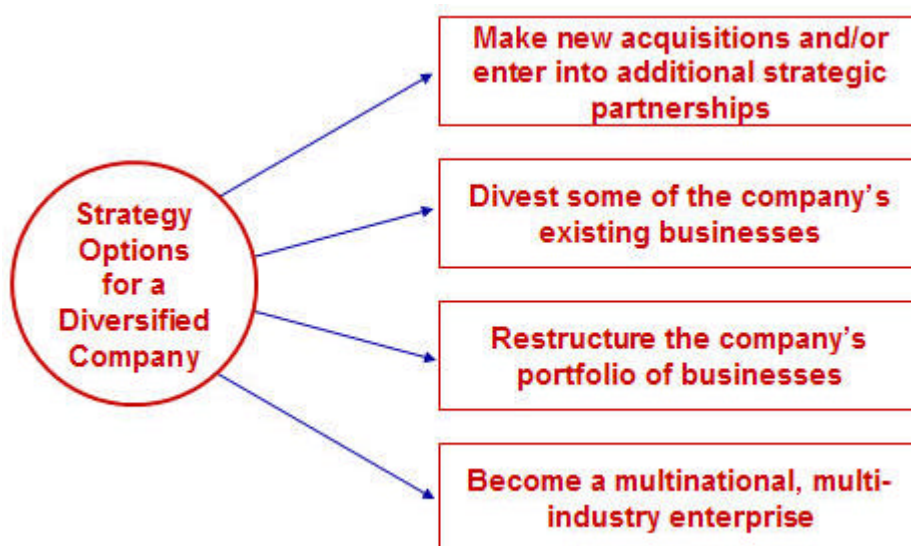
Drawbacks of Joint Ventures

- Raises questions ...
 - Which partner will do what
 - Who has effective control
- Potential conflicts ...
 - Control over strategy and long-term direction
 - How operations will be conducted
 - Control over cash flows and profits
 - Personalities and cultures of partners



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Strategy Options for a Company Already Diversified



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Strategies to Broaden a Diversified Company's Business Base

Conditions making this approach attractive ...

- Slow grow in current business

- Eminently transferable resources and capabilities to other related businesses
- Unexpected opportunity arises to acquire an attractive company
- Rapidly-changing conditions in one core industry are blurring boundaries with adjoining industries
- Desirable conditions favor new acquisitions to complement and strengthen market position of one or more of present businesses



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Divestiture Strategies Aimed at Retrenching to a Narrower Diversification Base



Strategic options...

- Retrenchment
- Divestiture ...
 - Spin it off as independent company
 - Sell it
 - Leveraged buyout

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Retrenchment Strategies



- **Objective ...**
 - Reduce scope of diversification to smaller number of “core “ businesses
- **Strategic options** involve **divesting** businesses ...
 - Having little strategic fit with core businesses
 - Too small to contribute to earnings

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Conditions That Make Retrenchment Attractive

- Diversification efforts have become too broad
- Difficulties encountered in profitably managing broad diversification
- Continuing losses in certain businesses
- Lack of funds or resources to support operating and investment needs of all businesses
- Misfits cannot be completely avoided
- Unfavorable changes in industry attractiveness
- Diversification may lack compatibility of values essential to cultural fit



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Options for Accomplishing Divestiture

- Spin it off as independent company
 - Involves deciding whether to retain partial ownership or forego any ownership interest
- Sell it
 - Involves finding a company which views the business as a good deal and good fit



- Leveraged buy out
 - Involves selling business to the managers who have been running it for a minimal equity down payment and loaning balance of purchase price to new owners

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Corporate Restructuring and Turnaround Strategies



- **Strategy options** for a diversified firm with **ailing** subsidiaries
- Why consider these options?
 - Large losses in one or more subsidiaries
 - Large number of businesses in unattractive industries
 - Bad economic conditions è Excessive debt load
 - Acquisitions performing worse than expected
 - New technologies threatening survival of one or more core businesses

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Corporate Restructuring Strategy

Objective

- Make radical changes in mix of businesses in portfolio via both ...
 - Divestitures and
 - New acquisitions



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Conditions That Make Portfolio Restructuring Attractive



- Long-term performance prospects are unattractive
- Core business units fall upon hard times
- New CEO takes over and decides to redirect where company is headed
- “Wave of the future” technologies emerge prompting a shakeup to build position in a new industry
- “Unique opportunity” emerges and existing businesses must be sold to finance new acquisition
- Major businesses in portfolio become unattractive
- Changes in markets of certain businesses proceed in such different directions, it's better to de-merge

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Corporate Turnaround Strategies



- Objectives
 - Restore money-losing businesses to profitability rather than divest them
 - Get whole firm back in the back by curing problems of ailing businesses in portfolio
- Most appropriate where
 - Reasons for poor performance are short-term
 - Ailing businesses are in attractive industries

- Divesting money-losers doesn't make long-term strategic sense

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Turnaround Strategies: The Options



- Sell or close down a portion of operations
- Shift to a different, and hopefully better, business-level strategy
- Launch new initiatives to boost revenues
- Pursue cost reduction
- Combination of efforts

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Comment: Trend in Diversification

The present *trend toward narrower diversification* has been driven by a growing preference to gear diversification around creating strong competitive positions in a few, well-selected industries as opposed to scattering corporate investments across many industries!

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Multinational Diversification Strategies



- **Distinguishing characteristic**
 - **Diversity of businesses** and **diversity of national markets**
- Presents a **big** strategy-making **challenge**
 - Strategies must be conceived and executed for each business, with as many multinational variations as appropriate

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Appeal of Multinational Diversification Strategies



Offer two avenues for **long-term growth** in **revenues** and **profits ...**

- Enter additional businesses
- Extend operations of existing businesses into additional country markets

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Opportunities to Build Competitive Advantage via Multinational Diversification

- Full capture of economies of scale and experience curve effects
- Capitalize on cross-business economies of scope



- Transfer competitively valuable resources from one business to another and/or from one country to another
- Leverage use of a competitively powerful brand name
- Coordinate strategic activities and initiatives across businesses and countries
- Use cross-business or cross-country subsidization to out-compete rivals

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Competitive Strength of a DMNC in Global Markets

Competitive advantage potential is based on ...



- Using a related diversification strategy based on
 - Resource-sharing and resource-transfer opportunities among businesses
 - Economies of scope and brand name benefits
- Managing related businesses to capture important cross-business strategic fits
- Using cross-market or cross-business subsidization sparingly to secure footholds in attractive country markets

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Competitive Power of a DMNC in Global Markets



A **DMNC** has a strategic arsenal capable of defeating **both** a **domestic-only rival** or a **single-business rival** by competing in ...

- Multiple businesses **and**
- Multiple country markets

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Lesson 10 - Evaluating the Strategies of Diversified Companies

Building Shareholder Value | Step 1: Identify Present Corporate Strategy | Step 2: Evaluate Industry Attractiveness | Step 3: Evaluate Competitive Strength of Business Units | Step 4: Strategic Fit Analysis | Step 5: Resource Fit Analysis | Step 6: Rank Business Units Based on Performance | Step 7: Decide on Resource Allocation Priorities and General Strategic Direction | Step 8: Crafting a Corporate Strategy | Guidelines for Managing the Corporate Strategy Process

"The corporate strategies of most companies have dissipated instead of created shareholder value."

Michael Porter

"Achieving superior performance through diversification is largely based on relatedness."

Philippe Very

Lesson Outline

- Identify Present Corporate Strategy
- Evaluate Industry Attractiveness
- Evaluate Competitive Strength of Business Units
- Strategic Fit Analysis
- Resource Fit Analysis
- Rank Business Units Based on Performance
- Decide on Resource Allocation Priorities and General Strategic Direction
- Crafting a Corporate Strategy
- Guidelines for Managing the Corporate Strategy Process

[GOTO TOP](#)

Building Shareholder Value: Questions to Ask About a Diversified Company



1. How attractive is the group of businesses the company has diversified into?
2. How good is the firm's overall performance outlook in the years ahead with these businesses?
3. If previous two answers aren't satisfactory, what should the firm do to realign its business lineup?
 - Divest unattractive businesses?
 - Strengthen positions of remaining ones?
 - Acquire new businesses?

How to Evaluate a Diversified Company's Strategy

► Step 1: Identify present corporate strategy

- Step 2: Evaluate long-term attractiveness of each industry firm is in
- Step 3: Evaluate competitive strength of firm's business units
- Step 4: Apply strategic fit test
- Step 5: Apply resource fit test
- Step 6: Rank business units based on historical performance and future prospects
- Step 7: Rank business units in terms of priority for resource allocation and decide on general strategic posture
- Step 8: Craft new strategic moves to improve overall company performance

Figure 10.1: Identifying a Diversified Company's Strategy



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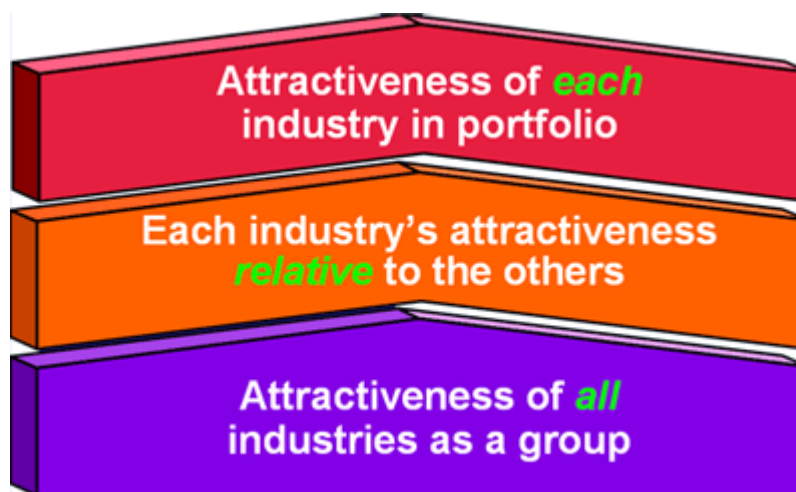
Step 1: Identify Present Corporate Strategy

- Extent to which firm is diversified (broad versus narrow, % of sales contributed by each business)
- Is portfolio keyed to related or unrelated diversification or both?
- Is scope of operations mostly domestic, increasingly multinational, or global?
- Recent moves to add new businesses
- Recent moves to divest weak businesses
- Actions to boost performance of key business units
- Efforts to capture cross-business strategic fit benefits and exploit value chain relationships to create competitive advantage
- Percentage of capital expenditures allocated to each business unit



[GOTO TOP](#)

Step 2: Evaluate Industry Attractiveness



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Industry Attractiveness Factors

- Market size and projected growth
- Intensity of competition
- Emerging opportunities and threats
- Seasonal and cyclical factors
- Resource requirements
- Cross-industry strategic fits and resource fits with present businesses
- Industry profitability
- Social, political, regulatory, and environmental factors
- Degree of risk and uncertainty



[STEP 2 | GOTO TOP](#)

Procedure: Rating the **Relative** Attractiveness of Each Industry

Step 1: Select industry attractiveness factors

Step 2: Assign weights to each factor (sum of weights = 1.0)

Step 3: Rate each industry on each factor (use scale of 1 to 10)

Step 4: Calculate weighted ratings; sum to get an overall industry attractiveness rating for each industry

Example: Rating Industry Attractiveness

Industry Attractiveness Factor	Weight	Attractiveness Rating	Weighted Industry Rating
Market size and projected growth	0.10	5	0.50
Intensity of competition	0.25	8	2.00
Strategic fits and resource fits with other industries in portfolio	0.15	5	0.75
Resource requirements	0.15	7	1.05
Emerging industry opportunities and threats	0.10	6	0.60

Seasonal and cyclical influences	0.05	4	0.20
Social, political, regulatory, and environmental factors	0.10	2	0.20
Industry uncertainty and business risk	0.10	5	0.50
Sum of weights	1.00		
Industry attractiveness rating			5.80

STEP 2 | GOTO TOP

Attractiveness of Mix of Industries as a Whole



How appealing is the whole group of industries in which the company is invested?

- Is the company in too many relatively unattractive industries?
- Does the portfolio of industries hold promise for attractive growth and profitability?
- Should some form of portfolio restructuring be considered?



STEP 2 | GOTO TOP

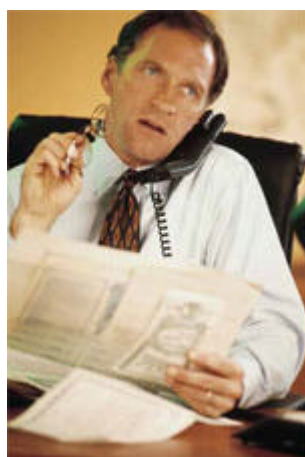
Step 3: Evaluate Each Business Unit's Competitive Strength

Objectives

- ▶ Determine how well each business is positioned in its industry relative to rivals
- ▶ Evaluate whether it is or can be competitively strong enough to contend for market leadership



Factors to Use in Evaluating Competitive Strength



- Relative market share
- Costs relative to competitors
- Ability to match/beat rivals on key product attributes
- Ability to exercise bargaining leverage with key suppliers or customers
- Caliber of alliances and collaborative partnerships
- Ability to benefit from strategic fits with sister businesses
- Technology and innovation capabilities
- How well business's competencies match industry KSFs
- Brand name recognition and reputation
- Profitability relative to competitors

STEP 3 | GOTO TOP

Procedure: Rating the Competitive Strength of Each Business

Step 1: Select competitive strength factors

Step 2: Assign weights to each factor (sum of weights = 1.0)

Step 3: Rate each business on each factor (use scale of 1 to 10)

Step 4: Calculate weighted ratings; sum to get an overall strength rating for each business

Example: Rating a Business Unit's Competitive Strength

Competitive Strength Measure	Weight	Strength Rating	Weighted Strength Rating
Relative market share	0.15	5	0.75
Costs relative to competitors	0.20	8	1.60
Ability to match rivals on key product attributes	0.10	7	0.70
Bargaining leverage	0.10	6	0.60
Strategic fit relationships	0.15	7	1.05
Technology and innovation capabilities	0.10	4	0.40
How well resources match KSFs	0.10	7	0.70
Degree of profit relative to rivals	0.10	5	0.50
Sum of weights	1.00		
Competitive Strength Rating			6.30

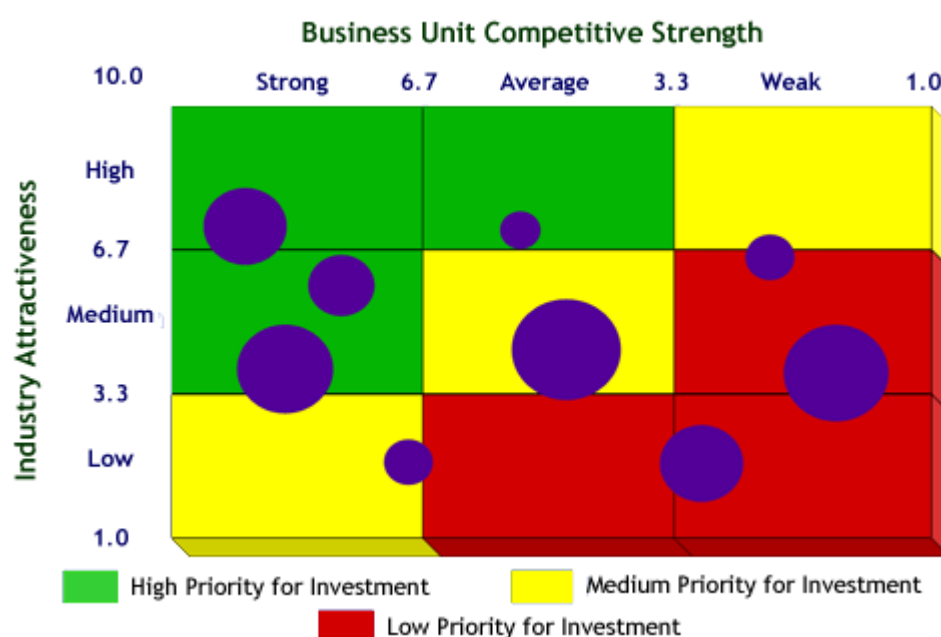
STEP 3 | GOTO TOP

Using a Matrix to Display Industry Attractiveness and Competitive Strength

Use **quantitative measures** of **industry attractiveness** and **business strength** to plot location of each business in matrix

Each business unit appears as a circle

- Area of circle is proportional to size of business as a percent of company revenues
- Or area of circle can represent relative size of industry with pie slice showing the company's market share

**Figure 10.2: Industry Attractiveness-Competitive Strength Matrix**

STEP 3 | GOTO TOP

Strategy Implications of Attractiveness/Strength Matrix



- Businesses in upper left corner
 - Accorded top investment priority
 - Strategic prescription - **grow and build**
- Businesses in three diagonal cells
 - Given medium investment priority
 - **Invest to maintain position**
- Businesses in lower right corner
 - Candidates for **harvesting or divestiture**
 - May, on occasion, be candidates for an **overhaul and reposition** strategy

[STEP 3 | GOTO TOP](#)

Appeal of the Attractiveness/Strength Matrix

- Incorporates a wide variety of strategically relevant variables
- Stresses concentrating corporate resources in businesses that enjoy
 - High degree of industry attractiveness and
 - High degree of competitive strength

The lesson here is **emphasize businesses that are market leaders or that can contend for market leadership**

[STEP 3 | GOTO TOP](#)

Step 4: Strategic Fit Analysis

Objective



- ▶ Determine **competitive advantage** potential of value chain relationships and strategic fits among sister businesses

Examine **strategic fit** from two angles

- Whether one or more businesses have valuable strategic fits with other businesses in portfolio
- Whether each business meshes well with firm's long-term strategic direction

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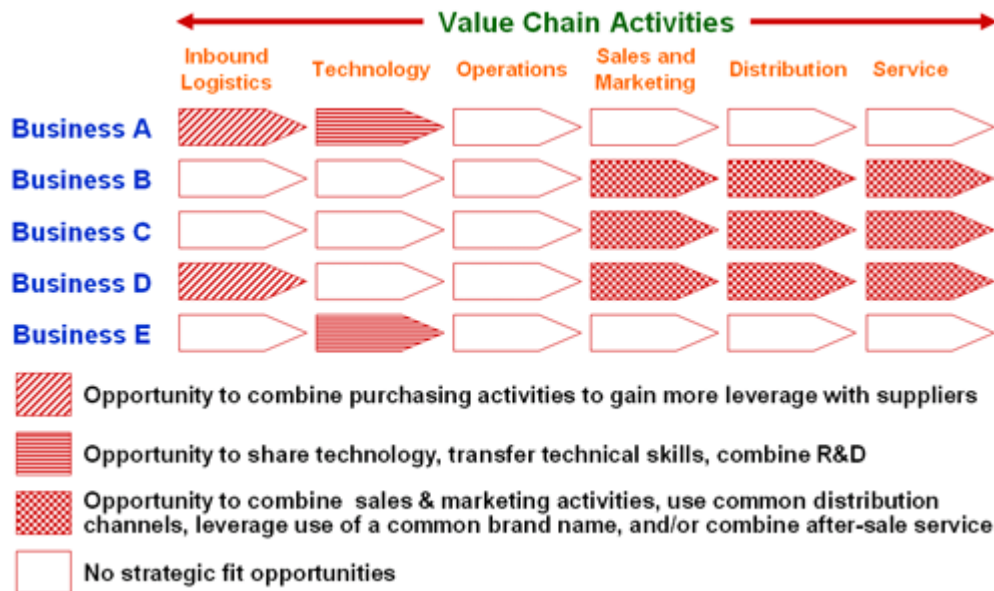
Evaluate Portfolio for Competitively Valuable Cross-Business Strategic Fits

Identify businesses which have **value chain matchups** offering opportunities to

- Reduce costs
 - Purchasing
 - E-commerce systems
 - Manufacturing
 - Distribution
- Transfer skills / technology / intellectual capital
- Leverage use of a well-known and competitively powerful brand name
- Create valuable new competitive capabilities or to leverage existing resources



Figure 10.3: Identify Cross-Business Strategic Fits



STEP 4 | GOTO TOP

Step 5: Assess Resource Fit



Objective

- ▶ Determine how well firm's resources match business unit requirements

Good **resource fit** exists when

- A business adds to a firm's resource strengths, either financially or strategically
- Firm has resources to adequately support requirements of its businesses as a group

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Checking for Financial Resource Fit

- Determine cash flow and investment requirements of the business units
 - Which are **cash hogs** and which are **cash cows**?
- Assessing **cash flow** of each business
 - Highlights opportunities to shift financial resources between businesses
 - Explains why priorities for resource allocation can differ from business to business
 - Provides rationalization for both invest-and-expand strategies and divestiture



STEP 5 | GOTO TOP

Characteristics of Cash Hogs

Internal cash flows are inadequate to fully fund needs for working capital and new capital investment

Parent company has to continually pump in capital to "feed the hog"

Strategic options

- Aggressively invest in attractive cash hogs



- Divest cash hogs lacking long-term potential

Characteristics of Cash Cows

Generate cash surpluses over and above what is needed to sustain present market position

Such businesses are valuable because surplus cash can be used to



- Pay corporate dividends
- Finance new acquisitions
- Invest in promising cash hogs

Strategic objectives

- Fortify and defend present market position
- Keep the business healthy

[STEP 5 | GOTO TOP](#)

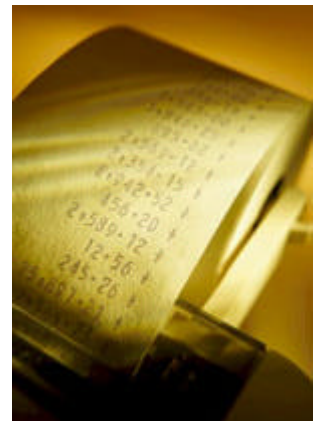
Good vs. Poor Financial Fit

Good financial fit exists when a business

- Contributes to achievement of corporate objectives
- Enhances shareholder value

Poor financial fit exists when a business

- Soaks up disproportionate share of financial resources
- Is an inconsistent bottom-line contributor
- Is too small to make a sizable contribution to total corporate earnings
- Experiences a profit downturn that could jeopardize entire company



[STEP 5 | GOTO TOP](#)

Checking for Competitive and Managerial Resource Fits

Involves determining whether :

- Resource strengths are well **matched** to **KSFs** of industries firm is in
- Ample **resource depth** exists to support resource requirements of all the businesses
- Ability exists to **transfer competitive capabilities** from one business to another
- Company must invest in **upgrading its resources/capabilities** to stay ahead of efforts of rivals

Notes of Caution: Why Diversification Efforts Can Fail



Transferring resource capabilities to new businesses can be far more arduous and expensive than expected

Trying to **replicate** a firm's success in one business and hitting a second home run in a new business is easier said than done

Management can **misjudge difficulty** of **overcoming resource strengths** of rivals it will face in a new business

[STEP 5 | GOTO TOP](#)

Step 6: Rank Business Units Based on Financial Performance



Yardsticks for comparing performance of different businesses

- ▶ Sales growth
- ▶ Profit growth
- ▶ Contribution to company earnings
- ▶ Return on capital employed in business
- ▶ Cash flow generation



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Step 7: Decide Resource Allocation Priorities and Strategic Direction



Objective

- ▶ “Get the biggest bang for the buck” in allocating corporate resources

Procedure :

- Rank each business from **highest to lowest priority** for corporate resource support and new investment
- Decide on **general strategic direction** for each business

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Options: General Strategic Direction

- **Invest and grow**
 - Aggressive expansion
- **Fortify and defend**
 - Protect current position
- **Overhaul and reposition**
 - Make major strategy changes
- **Harvest or divest**
 - Gradual market retreat
 - Spin off business as independent company
 - Sell business



[STEP 7 | GOTO TOP](#)

Options for Allocating Financial Resources

Strategic purposes

Strategic Business Analysis

- Invest in ways to strengthen or expand existing businesses
- Make acquisitions to establish positions in new industries
- Fund long-range R&D ventures



Financial purposes

- Pay off existing long-term debt
- Increase dividends
- Repurchase company's stock



[STEP 7 | GOTO TOP](#)

Step 8: Crafting a Corporate Strategy - Key Issues



- Are enough businesses in attractive industries?
- Is the number of mature or declining businesses so great corporate growth will be sluggish?
- Are businesses overly vulnerable to seasonal influences or recession?
- Are there too many average-to-weak businesses in the company's business make-up?
- Is there ample strategic fit among the businesses?
- Is there ample resource fit among the businesses?
- Are there enough cash cows to finance those cash hogs with potential to be star performers?
- Do core businesses generate dependable profits and/or cash flow?
- Does makeup of business portfolio put firm in good future position?

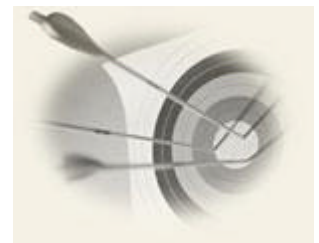


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The Performance Test

Can the company's **performance targets** be reached with the current businesses?

- If **yes**, no major corporate strategy changes are indicated
- If a **performance gap** is likely, actions can be taken to close the gap



Options for Addressing a Performance Shortfall

- Alter strategic plans for some, or all, of businesses
- Add new businesses
- Divest weak-performing businesses
- Form cooperative alliances
- Upgrade firm's resource base

- Lower corporate performance objectives

[STEP 8 | GOTO TOP](#)

Identifying Additional Diversification Opportunities

Related Diversification

- Identify businesses whose [value chains](#) have fits with value chains of present businesses
- Identify businesses whose resource requirements are well-matched to firm's [corporate resource capabilities](#)

Unrelated Diversification

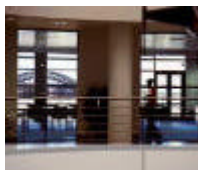
- Find firms offering [attractive financial returns](#) regardless of industry

How Do Corporate Strategies Form?

In diversified companies corporate strategy tends to emerge [incrementally](#)



- As internal and external events unfold
- As managers
 - Probe the future
 - Experiment
 - Gather more information
 - Sense problems
 - Build awareness of options
 - Spot new opportunities
 - Develop ad hoc responses to unexpected crises
 - Acquire a feel for strategically relevant factors and their importance and interrelationships
 - Develop consensus of how to proceed



[STEP 8 | GOTO TOP](#)

Managing the Process of Crafting Corporate Strategy

- Not done all at once in comprehensive fashion
- Approached a step at a time, emerging gradually
- Begin with broad, intuitive concepts and then fine-tune and embellish them as
 - More information is gathered
 - Formal analysis confirms or modifies emerging judgments about situation
 - Confidence and consensus build for the proposed strategic moves



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Lesson 11 - Building Resource Capabilities and Organizing the Work Effort

|Strategy Implementation Framework | Principle Strategy-Implementing Tasks | Leading the Implementation Process | Building a Capable Organization | Staffing the Organization | Building Core Competencies and Competitive Capabilities | Matching Organization Structure to Strategy | Identifying Strategy-Critical Activities | Organizational Structures of the Future |

"The best game plan in the world never blocked or tackled anybody."

Vince Lombardi

**"Flat organizations of empowered people are critical to gaining quick decisions
in a global marketplace that moves at Net speed."**

John Byrne

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Implementing and Executing Strategy



- Action-oriented, operations-driven activity revolving around managing people and business processes
- Tougher and more time-consuming than crafting strategy
- Success depends on doing a good job of ...
 - Leading
 - Motivating
 - Working with others
 - Creating fits between requirements for good strategy execution and how organization conducts its business

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Why Implementing and Executing Strategy is a Tough Management Job



- Demanding variety of managerial activities that have to be performed
- Numerous ways to tackle each activity
- Requires good people management skills
- Requires launching and managing a variety of initiatives simultaneously
- Number of bedeviling issues to be worked out
- Battling resistance to change
- Hard to integrate efforts of many different work groups into a smoothly-functioning whole

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Implementing a Newly Chosen Strategy Requires Adept Leadership

- Implementing a new strategy takes adept leadership to ...
 - Convincingly communicate reasons for the new strategy
 - Overcome pockets of doubt
 - Build consensus and enthusiasm
 - Secure commitment of concerned parties
 - Get all implementation pieces in place and coordinated



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Characteristics of the Strategy Implementation Process



- Every manager has an active role
- No 10-step checklists
- Few concrete guidelines
- Least charted, most open-ended part of strategic management
- Cuts across many aspects of “how to manage”
- Each implementation situation occurs in a different context, affected by differing
 - Business practices and competitive situations
 - Work environments and cultures
 - Policies
 - Compensation incentives
 - Mix of personalities and firm histories
- Approach to implementation has to be customized to fit the situation
- People implement strategies - Not companies!

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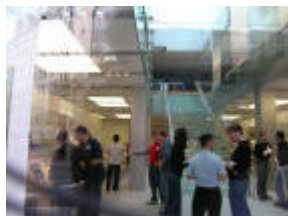
The Eight Components of Implementing and Executing Strategy



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What are the Goals of the Strategy Implementing - Executing Process?

- Unite total organization behind strategy
- See that activities are done in a manner tightly matching first-rate strategy



execution

- Generate commitment so an enthusiastic crusade emerges to carry out strategy
- Fit how the organization conducts its operations to the requirements of strategy

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Who are the Strategy Implementers?

- Implementation involves a company's whole management team ...
 - Every organization unit and all employees have a role in the strategy implementing and executing process
- CEO, senior executives, and heads of major departments must lead the process and orchestrate major initiatives ...
 - But they must rely on middle and lower-level managers to push things on the front line, seeing that strategy is well-executed on a daily basis



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Ways to Lead the Implementation and Execution Process



- Take active, visible role or low-key, behind the scenes role
- Make decisions authoritatively or based on consensus
- Delegate much or little
- Be personally involved in details or coach others to carry day-to-day burden
- Proceed swiftly to achieve results or move deliberately, content with gradual progress

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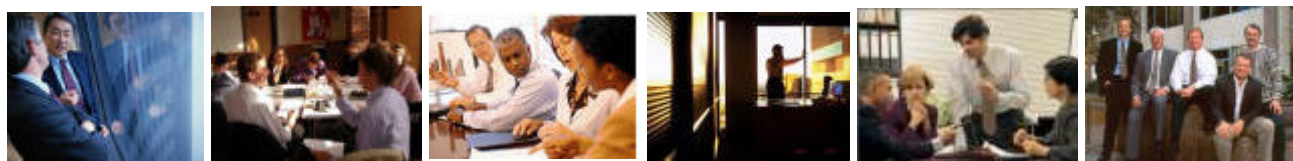
Factors Shaping How Managers Lead the Implementation Process



- Experience and knowledge of business
- New to job or seasoned?
- Network of personal relationships
- Diagnostic, administrative, interpersonal, and problem-solving skills
- How much authority they have
- Leadership style most comfortable with
- How they view their role in getting things done
- The organization's situation

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BUILDING A CAPABLE ORGANIZATION - WHAT IS INVOLVED?



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The Components of Building a Capable Organization



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Putting Together a Strong Management Team



- Determine kind of core management team needed to execute the strategy
- Find the right people to fill each slot
 - Existing management team may be suitable
 - Core executive group may need strengthening
 - Promote from within
 - Bring in skilled outsiders

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Selecting the Management Team: Key Considerations



- Determine mix of ...
 - Backgrounds
 - Experiences and know-how
 - Beliefs and values
 - Styles of managing and personalities
- Personal chemistry must be right
- Talent base needs to be appropriate
- Picking a solid management team needs to be acted on early in implementation process

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Recruiting and Retaining Talented Employees: Implementation Issues



- Assemble the needed human resources and knowledge base for effective strategy execution
- Biggest challenge facing companies building a future in the Internet Economy
 - How to recruit and retain the best and brightest talent with strong skill sets and management potential
- Intellectual capital, not tangible assets, is increasingly being viewed as the most important investment

- Talented people are a prime source of competitive advantage

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Key Human Resource Practices to Attract and Retain Talented Employees

train your
employees



- Spend considerable effort in screening job applicants, selecting only those with ...
 - Suitable skill sets
 - Energy and initiative
 - Judgment and aptitudes for learning
 - Ability to adapt to firm's work environment/culture
- Put employees through training programs throughout their careers
- Give employees challenging, interesting, and skills-stretching assignments
- Rotate employees through jobs with great content, spanning functional and geographic boundaries
- Encourage employees to ...
 - Be creative and innovative
 - Challenge existing ways of doing things and offer better ways
 - Submit ideas for new products or businesses
- Foster a stimulating and engaging work environment
- Exert efforts to retain high-potential, high performing employees with excellent salary and benefits

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Key Organization - Building Objectives



- Staff organizational units with the specialized talents, skills, and technical expertise needed to develop and build **core competencies**
- Build competitively valuable **organizational capabilities**

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Power of Unique Competencies and Capabilities



Strategically - Relevant Core or Distinctive Competencies



- Greater proficiency in product development
- Better manufacturing know-how
- Capability to provide better after-sale service
- Faster response to changing customer needs
- Superior cost-cutting skills
- Capacity to speed new products to market
- Superior inventory management systems
- Better marketing and merchandising skills
- Specialized depth in unique technologies
- Greater effectiveness in promoting union-management cooperation





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Strategic Management Principle

Building core competencies, resource strengths, and organizational capabilities
that rivals can't match
 is a sound foundation for sustainable competitive advantage !

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Examples of Core Competency

Honda		Expertise in gasoline engine technology and small engine design
Intel		Design of complex chips for personal computers
Proctor & Gamble		Superb marketing-distribution skills and R&D capabilities in five core technologies - fats, oils, skin chemistry, surfactants, emulsifiers
Sony		Expertise in electronic technology and ability to translate the expertise into innovative products - miniaturized radios and video cameras, TVs and VCRs with unique features, attractively designed PCs

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Key Traits to Building Core Competencies



1. Rarely grounded in **skills** or **know-how** of a **single department**
2. Typically emerge from **collaborative efforts** of different work groups, requiring senior management oversight
3. Leveraging competencies into competitive advantage requires **concentrating more effort** and **talent** than rivals on **strengthening competencies** to create valuable organizational capabilities
4. Sustaining competitive advantage requires **adapting competencies to new conditions**

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Developing Competitively Valuable Competencies



- Involves ..
 - **Managing** human skills, knowledge bases, and intellect
 - **Coordinating** efforts of related work groups
 - **Collaborative networking** among internal groups and with external partners
 - Achieving **dominating depth**
- **Senior managers** have to **guide** the process
- **Ongoing challenge:** Broaden, deepen, or modify competencies and capabilities in response to market changes

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Building Competencies: Keys to Success



- Selecting superior employees
- Training
- Cultural influences
- Cooperation and collaboration
- Motivation
- Empowerment
- Attractive incentives
- Organizational flexibility
- Short deadlines
- Good databases

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The Most Valuable Organizational Capabilities

- Contribute heavily to **better strategy execution**
- Provide **a differentiating factor** customers can see and value
- **Difficult** for **rivals to match**
 - Time consuming to build
 - Difficult to purchase
 - Hard to replicate or imitate



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Process of Building Organizational Capabilities

1. Develop **ability** to do something
 - Select people with relevant skills/experience
 - Upgrade individual abilities as needed
 - Mold work of employees into cooperative effort
2. As **experience builds**, **ability** can translate into a **competence** and/or **capability**



3. Capability becomes a ***distinctive competence*** , resulting in a potential competitive advantage

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Process of Building Organizational Capabilities: Step 1



Develop ***ability*** to do something ...

- Select people with relevant skills/experience
- Broaden or deepen individual abilities as needed
- Mold efforts and work products of individuals into a cooperative group effort to ***create organizational ability***

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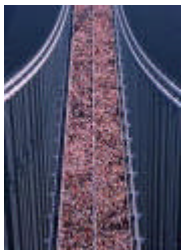
Process of Building Organizational Capabilities: Step 2



- As experience builds, such that the organization learns to accomplish the activity consistently well and at acceptable cost, the ***"ability"*** begins to translate into a ***competence*** and/or a ***capability***
- Capabilities emerge from establishing and nurturing collaborative working relationships between individuals and groups in departments and between a company and its external allies

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Process of Building Organizational Capabilities: Step 3

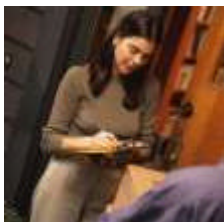


If mastery is achieved to the point where the organization has the capability to ***perform the activity better than rivals*** , the "capability" becomes a ***distinctive competence*** and holds potential for competitive advantage

The optimal outcome of the capability - building process !

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Updating Competencies and Capabilities as Conditions Change



- Competencies and capabilities must continuously be modified and perhaps even replaced with new ones due to ...
 - New strategic requirements
 - Evolving market conditions
 - Changing customer expectations
- Ongoing efforts to keep core competencies up-to-date can provide a basis for sustaining both ...
 - Effective strategy execution and
 - Competitive advantage

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Strategic Role of Employee Training

- Plays a critical role in implementation when a firm shifts to a strategy requiring different

- Skills-based competencies
- Competitive capabilities
- Managerial approaches
- Operating methods
- Types of training approaches
 - Internal “universities”
 - Orientation sessions for new employees
 - Tuition reimbursement programs
 - Online training courses

TRAINING & DEVELOPMENT



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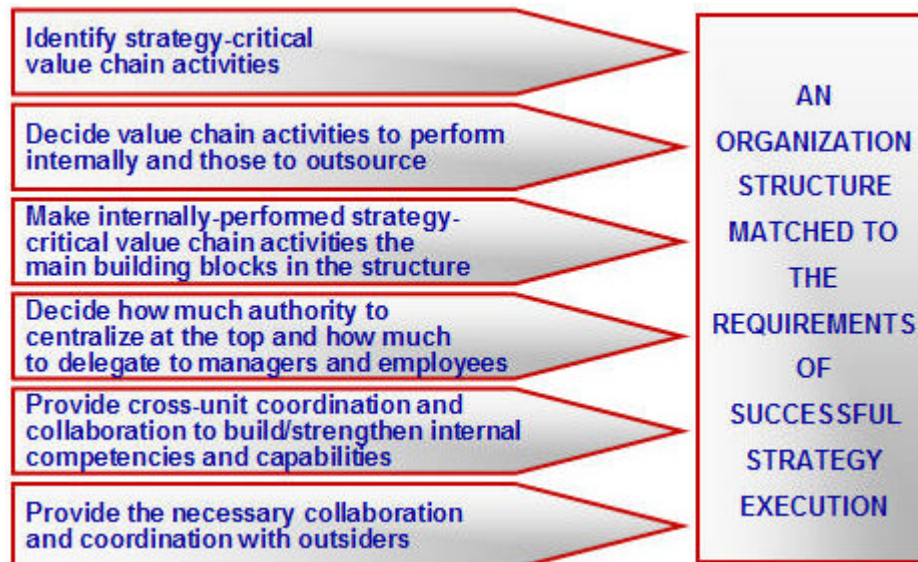
Matching Organization Structure to Strategy



- Few hard and fast rules for organizing
 - ***The One Big Rule: The role and purpose of the organization structure is to support and facilitate good strategy execution!***
- Each firm's structure is idiosyncratic, reflecting
 - Prior arrangements and internal politics
 - Executive judgments and preferences about how to arrange reporting relationships
 - How best to integrate and coordinate work effort of different work groups and departments

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Structuring the Organization to Promote Successful Strategy Execution



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Step 1: Identify Strategy-Critical Activities

- Which activities are strategy-critical depends on ...
 - Particulars of a firm's strategy
 - Value-chain make-up
 - Competitive requirements
 - External market conditions



- Identify strategy-critical activities ...
 1. What business processes have to be performed extra well or in timely fashion to achieve competitive advantage?
 2. In what value-chain activities would poor work performance impair strategic success?

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Step 2: Potential Advantages of Outsourcing Non-Critical Activities

- Decrease internal bureaucracies
- Flatten organization structure
- Speed decision-making
- Provide firm with heightened strategic focus
- Improve a firm's innovative capacity
- Increase competitive responsiveness



Outsourcing makes *strategic sense* when ...
outsiders can perform certain activities at a lower cost and/or with higher value-added.

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Appeal of Outsourcing



- Outsourcing non-critical activities allows a firm to concentrate its energies and resources on those value-chain activities where it ...
 - Can create unique value
 - Can be best in the industry
 - Needs strategic control to ...
 - Build core competencies
 - Achieve competitive advantage
 - Manage key customer-supplier-distributor relationships

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Potential Advantages of Partnering



- By building, improving, and then leveraging partnerships, a firm enhances its overall capabilities and builds resource strengths that ...
 - Deliver value to customers
 - Rivals can't quite match
 - Consequently pave the way for competitive success

Partnering makes *strategic sense* when the result is to enhance organizational capabilities.

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Step 3: Make Strategy-Critical Activities the Main Building Blocks

- Assign managers of strategy-critical activities a visible, influential position



- Avoid fragmenting responsibility for strategy-critical activities across many departments
- Provide coordinating linkages between related work groups
 - Meld into a valuable competitive capability

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Strategic Management Principle

Matching structure to strategy
requires making **strategy-critical activities and organizational units**
the main building blocks in the organization structure!

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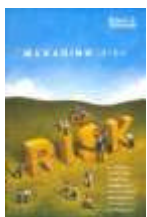
Why Structure Follows Strategy



- **Changes in strategy** typically require a **new structure ...**
 - New strategy often involves different skills, different key activities, different staffing and organizational requirements
 - Hence, a new strategy signals a need to reassess the organization structure
- How work is structured is a **means to an end – not an end in itself!**

[GOTO TOP](#)

Guard Against Functional Designs That Fragment Activities



- **Scattering** pieces of critical business processes across several specialized departments results in ...
 - Many **hand-offs** which ...
 - Lengthens **completion time**
 - Increases coordination and overhead costs
 - Increases risk of details falling through the cracks
 - Obsession with **activity** rather than **result**
- **Solution -> Business process reengineering ...**
 - Involves **pulling strategy-critical processes** from functional silos to create **process-complete** departments or **cross-functional** work groups

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Example: Fragmented Strategy-Critical Activities in a Functional Structure

- Filling customer orders
- Speeding new products to market
- Improving product quality
- Supply chain management

- Building capability to conduct business via the Internet
- Obtaining feedback from customers, making product modifications to meet their needs



[GOTO TOP](#)

Step 4: Determine How Much Authority to Delegate to Whom



- In a centralized structure ...
 - Top managers retain authority for most decisions
- In a decentralized structure ...
 - Managers and employees are empowered to make decisions
- Trend in most companies ...
 - Shift from authoritarian to decentralized structures stressing empowerment

[GOTO TOP](#)

Advantages of Decentralized Decision-Making and Empowerment



- Fewer management layers
- Less bureaucracy
- Shorter response times
- More creativity and new ideas
- Better motivation of employees
- Greater employee involvement
- Increased organizational capability

[GOTO TOP](#)

Principles Underlying the Global Trend Toward Decentralization and Empowerment

1. As the world economy moves into the **Internet Age**, traditional **hierarchical structures** must undergo radical **surgery** to **capitalize** on ...
 - External market **and**
 - Internal operating potential of e-commerce
2. **Decisions** are **best made** at the **lowest organizational level** capable to make timely, informed, competent decisions
3. **Empowering** employees to exercise judgment on job-related matters **improves motivation** and **job performance**



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Step 5: Reporting Relationships and Cross-Unit Coordination



- **Classic method** of **coordinating** activities - Have **related units report** to **single manager**
 - Upper-level managers have clout to coordinate/unify efforts of their units
- **Support activities** should be **woven** into **structure** in ways to
 - **Maximize performance** of **primary activities**
 - **Contain costs** of **support activities**
- **Formal reporting relationships** often need to be **supplemented**

[GOTO TOP](#)

Options to Supplement the Basic Organization Structure



- Coordinating teams
- Cross-functional task forces
- Dual reporting relationships
- Informal networking
- Incentive compensation tied to group performance
- Teamwork and inter-departmental cooperation

[GOTO TOP](#)

Step 6: Assign Responsibility for Collaboration With Outsiders

- Need **multiple ties at multiple levels** to ensure
 - Communication
 - Coordination and control
- Find ways to **produce collaborative efforts** to **enhance** firm's **capabilities** and **resource strengths**
- While collaborative relationships present opportunities, **nothing valuable is realized until the relationship develops into an engine for better organizational performance**



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Roles of Relationship Managers With Strategic Partners



- Get the right people together
- Promote good rapport
- See that plans for specific activities are developed and implemented
- Help adjust internal procedures and communication systems to ...
 - Successfully link partners
 - Iron out operating dissimilarities
 - Nurture interpersonal ties

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Perspectives on Organizing



- All basic **organization designs** have strategy- related **strengths** and **weaknesses**
- No **ideal** organization design exists
- To do a good job of **matching structure to strategy ...**
 - Pick a basic design
 - Modify as needed
 - Supplement with appropriate coordinating, networking, and communication mechanisms to support effective execution of the strategy

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Organizational Structures of the Future: Overall Themes

- Revolutionary changes in **how** companies **organize work** have been triggered by ...
 - New strategic priorities



- Rapidly shifting competitive conditions
- **Tools of *organizational design*** include ...
 - Empowered managers and workers
 - Reengineered work processes
 - Self-directed work teams
 - Rapid incorporation of Internet technologies and cutting-edge e-commerce infrastructure
 - Networking with outsiders

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Organizational Structures of the Future: Overall Themes



Traditional, authoritarian structures have often proved to be a **liability** where ...

- Market conditions are fluid
- Customer preferences shift from standardized to customized products
- Product life-cycles grow shorter
- Flexible manufacturing replaces mass production
- Customers want to be treated as individuals
- Pace of technological change accelerates

[GOTO TOP](#)

Organizational Structures of the Future: Requirements for Success



- Decentralized structures with fewer managers
- Small-scale business units
- Reengineering to decrease fragmentation
- Development of stronger and newer capabilities
- Collaborative partnerships with outsiders
- Empowerment and self-directed work teams
- Lean staffing of corporate support functions
- Electronic information systems
- Accountability for results
- Use of e-commerce in daily operations

[GOTO TOP](#)

Characteristics of Organizations of the Future



- Fewer boundaries between ...
 - Different vertical ranks
 - Functions and disciplines
 - Units in different geographic locations
 - Firm and its suppliers, distributors, strategic allies, and customers
- Capacity for change and learning
- Collaborative efforts among people in different functions and geographic locations
- Extensive use of e-commerce technology and Internet business practices

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Strategic Business Analysis

Lesson 12 - Implementing and Executing Strategy: Budgets, Policies, Best Practices, Support Systems And Rewards

Link Budgets to Strategy

Establish Strategy - Supportive Policies - Creating Strategy-Supportive Policies and Procedures

Mechanisms for Continuous Improvement - Characteristics of Benchmarking | TQM | TQM Approaches | Twelve Aspects |

Implementing a Philosophy of Continuous Improvement | Characteristics of TQM | TQM vs. Process Reengineering

Install Support Systems - Examples: Support Systems | Formal Reporting | Exercising Adequate Control

Design Strategy-Supportive Reward Systems - Approaches | Examples: Motivational Practices | Balancing Positive vs. Negative Rewards | Linking the Reward System to Performance Outcomes | Key Considerations in Design

"If you talk about change but don't change the reward and recognition system, nothing changes."

*Paul Allaire
CEO, Xerox Corp.*

Link Budgets to Strategy



Linking Budgets to Strategy

Allocating resources in ways that support **effective strategy execution involves**



- ▶ **Funding capital projects** that can make a contribution to strategy implementation
- ▶ **Funding efforts** to strengthen competencies and capabilities or to create new ones
- ▶ **Shifting resources**—downsizing some areas, upsizing others, killing activities no longer justified, and funding new activities with a critical strategy role

Strategic Management Principle

Depriving **strategy-critical** groups of the funds needed to execute their pieces of the strategy can undermine the implementation process!

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Establish Strategy - Supportive Policies



How Policies and Procedures Aid Strategy Implementation



- Provide top-down guidance regarding expected behaviors
- Help align internal actions with strategy, channeling efforts along the intended path
- Enforce consistency in performance of activities in geographically scattered units
- Serve as powerful lever for changing corporate culture to produce stronger fit with a new strategy

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Creating Strategy-Supportive Policies and Procedures

- Role of **new policies**
 - Channel behaviors and decisions to promote strategy execution
 - Counteract tendencies of people to resist chosen strategy
- **Too much** policy can be **as stifling as**
 - **Wrong policy** or as
 - **Chaotic** as **no policy**

Often, the **best policy** is **empowering employees** and letting them operate between the white lines anyway they think best

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Institute Best Practices and Mechanisms for Continuous Improvement



Instituting Best Practices and Continuous Improvement

Searching out and adopting **best practices** is integral to effective implementation

Benchmarking has spawned new approaches to improve strategy execution



- Reengineering
- TQM
- Continuous improvement programs

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Characteristics of Benchmarking

- Involves determining **how well** a firm **performs** particular **activities** and **processes** against
 - **“Best in industry”** and/or **“Best in world”** performers
- Represents a solid **methodology** to **identify options to improve**



Caution - Exact duplication of best practices of other firms is not feasible due to differences in implementation situations

Best approach - Best practices of other firms need to be modified or adapted to a firm's own specific situation

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What is Total Quality Management?



TQM is a philosophy of managing a set of business practices that emphasizes

- Continuous improvement in all phases of operations,
- 100 percent accuracy in performing activities,
- Involvement and empowerment of employees at all levels,
- Team-based work design,
- Benchmarking, and
- Fully satisfying customer expectations

Goals of Quality Improvement Programs

- Defect-free manufacture
- Superior product quality
- Superior customer service
- Total customer satisfaction



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Popular TQM Approaches

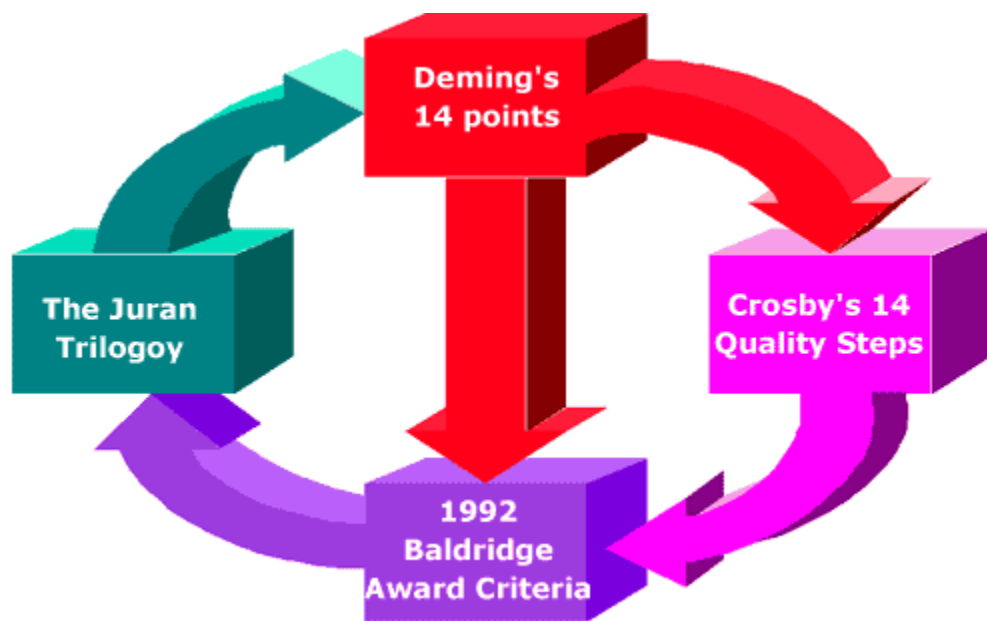


Table 12.1: Components of Popular TQM Approaches

Deming's 14 Points	
1. Constancy of purpose 2. Adopt the philosophy 3. Don't rely on mass inspection 4. Don't award business on price 5. Constant improvement 6. Training 7. Leadership	8. Drive out fear 9. Break down barriers 10. Eliminate slogans and exhortations 11. Eliminate quotas 12. Pride of workmanship 13. Education and retraining 14. Plan of action

[TQM APPROACHES](#) | [GOTO TOP](#)

The Juran Trilogy		
Quality Planning	Quality Control	Quality Improvement
Set goals Identify customers and their needs Develop products and processes	Evaluate performance Compare to goals and adapt	Establish infrastructure Identify projects and teams Provide resources and training Establish controls

[TQM APPROACHES](#) | [GOTO TOP](#)

Crosby's 14 Quality Steps	
1. Management commitment 2. Quality improvement teams	8. Supervisor training 9. Zero-defects day

3. Quality measurement
4. Cost of quality evaluation
5. Quality awareness
6. Corrective action
7. Zero-defects committee

10. Goal-setting
11. Error cause removal
12. Recognition
13. Quality councils
14. Do it over again

[TQM APPROACHES](#) | [GOTO TOP](#)

1992 Baldrige Award Criteria (1000 points)



[TQM APPROACHES](#) | [GOTO TOP](#)

Twelve Aspects Common to TQM and Continuous Improvement Programs

1. Committed leadership
2. Adoption and communication of TQM
3. Closer customer relationships
4. Closer supplier relationships
5. Benchmarking
6. Increased training

7. Open organization
8. Employee empowerment
9. Zero-defects mentality
10. Flexible manufacturing
11. Process improvement
12. Measurement

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Implementing a Philosophy of Continuous Improvement



- **Instill** enthusiasm to **do things right** throughout company
- **Strive** to achieve little steps forward each day, (what the Japanese call **kaizen**)
- **Ignite creativity** in employees to improve performance of value-chain activities
- **Preach** there is no such thing as **good enough**
- **Reform** the corporate culture

Characteristics of TQM / Continuous Improvement Programs

- Valuable *competitive asset* in a company's resource portfolio
- Have *hard-to-imitate* aspects
- Require substantial *investment* of management *time* and *effort*
- *Expensive* in terms of *training* and *meetings*
- *Seldom* produce *short-term results*
- *Long-term payoff* —instilling a *TQM culture*

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TQM vs. Process Reengineering



- **Reengineering**
 - Aims at quantum gains of 30 to 50% or more
- **TQM**
 - Stresses incremental progress

Techniques are not mutually exclusive

- **Reengineering** - Used to produce a good basic design yielding dramatic improvements
- **TQM** - Used to perfect process, gradually improving efficiency and effectiveness

Using Best Practice Programs as an Implementation Tool

- *Select* indicators of successful strategy execution
- *Benchmark* against best practice companies
- *Reengineer* business processes
- *Build* a *TQ culture*
 - Requires top management commitment
 - Install TQ-supportive employee practices
 - Empower employees to do the right things
 - Provide employees with quick access to required information
 - Preach that performance can be improved

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Install Support Systems







Installing Support Systems





- Essential to promote successful strategy execution
- Types of support systems
 - On-line data systems
 - Internet and company intranets
 - Electronic mail
 - E-commerce systems
- Mobilizing information and creating systems to use knowledge effectively can yield
 - Competitive advantage

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Examples: Support Systems

Airlines	
	Computerized Reservation System
Federal Express	
	Computerized parcel-tracking system Leading-edge flight operations systems E-business tools
Otis Elevator	
	Sophisticated maintenance support system
Arthur Andersen	
	Internet and digital technology (Knowledge Xchange system has data, voice, and video capabilities) links more than 70,000 people in 382 offices in 81 countries
Domino's Pizza	

	Computerized systems at each outlet facilitate <ul style="list-style-type: none">○ ordering○ inventory○ payroll○ cash flow○ and work flow functions
Mrs. Fields' Cookies	
	System to monitor sales, at 15-minute intervals, to suggest product mix changes and to improve customer response

Strategic Management Principle

Innovative, state-of-the-art support systems can be a basis for competitive advantage if they give a firm capabilities that rivals can't match!

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Formal Reporting of Strategy-Critical Information

- **Accurate, timely information** is essential to guide action
- Prompt **feedback** on implementation activities is **needed before actions** are fully **completed**
- Key **strategic performance indicators** must be **tracked** as often as practical
- **Barometers** of overall **performance**
 - Statistical information
 - Reports and meetings
 - Personal contact



What Areas Should Information Systems Address?



- ▶ Customer data
- ▶ Operations data
- ▶ Employee data
- ▶ Supplier/partner/collaborative ally data
- ▶ Financial performance data

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Exercising Adequate Control Over Empowered Employees

- **Challenge** - How to ensure actions of employees stay within acceptable bounds
- Purpose of diagnostic control systems

- Relieve managers of burden of constant monitoring
- Control methods
 - Establish boundaries on what not to do, allowing freedom to act with limits
 - Face-to-face meetings to assess performance



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Design Strategy-Supportive Reward Systems



stakeholder status for all –
targeted incentives for selected staff

Gaining Commitment: Components of an Effective Reward System

Monetary Incentives

- Salary raises
- Performance bonuses
- Stock options
- Retirement packages
- Promotions
- Perks



Non-monetary Incentives

- Praise
- Constructive criticism
- Special recognition
- More, or less, job security
- Interesting assignments
- More, or less, job responsibility



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Approaches: Motivating People to Execute the Strategy Well

- Inspire employees to do their best
- Get employees to buy into strategy
- Structure individual efforts in teams to facilitate a supportive climate
- Allow employees to participate in decisions about their jobs
- Make jobs interesting and satisfying
- Devise strategy-supportive motivational approaches

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Examples: Motivational Practices

No Layoff Policies

Japanese automobile producers, along with several U.S. based companies (Southwest Airlines, FedEx, Lands' End, and Harley Davidson) have no lay-off policies, using employment security both as a positive motivator and a means of reinforcing good strategy execution.



Stock Options

More than 35 of the 58 publicly held companies on the 1999 list of the 100 Best Companies to Work for in America (includes Cisco Systems, Procter & Gamble, Merck, Charles Schwab, General Mills, Amgen, and Tellabs) provide stock options to all employees. Having employee-owners sharing in a company's success is widely viewed as a positive motivator.



Nordstrom

Pay salespeople higher than prevailing rates, plus commission.

“Rule #1: Use good judgment in all situations. There will be no additional rules.”

Cisco Systems



Offers **on-the-spot bonuses** of up to \$2,000 for exceptional performance.

Microsoft

Team members enjoy working 60-80 hours per week for a leading edge company, accompanied by **attractive pay** and lucrative **stock options**.

Lincoln Electric



Rewards productivity by paying for each piece produced (defects can be traced to worker causing them). Bonuses of 50 to 100% are common.

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Balancing Positive vs. Negative Rewards

- Elements of both are necessary
 - Challenge and competition are necessary for self-satisfaction
- Prevailing view
 - Positive approaches work better than negative ones in terms of
 - Enthusiasm
 - Effort
 - Creativity
 - Initiative



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Linking the Reward System to Performance Outcomes

Rewards are the single most **powerful tool** to win **commitment** to the strategy

Objectives

- **Generously reward** those achieving objectives
- **Deny rewards** to those who don't
- Make **strategic performance measures** the dominant basis for designing incentives, evaluating efforts, and, handing out rewards

Strategic Management Principle

A properly designed reward structure is management's most powerful tool for mobilizing organizational commitment to successful strategy execution!

Strategic Management Principle

The unwavering standard for judging whether individuals, teams, and organizational units have done a good job must be whether they achieve performance targets consistent with effective strategy execution!

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Key Considerations in Designing Reward Systems



- Create a **results-oriented** system
- **Reward** people for **results**, not for activity
- Define jobs in terms of **what to achieve**
- Incorporate **several** performance **measures**
- Tie **incentive compensation** to **relevant outcomes**
 - Top executives—Key measures of overall firm performance
 - Department heads, teams, and individuals Incentives tied to achieving performance targets in their areas of responsibility

Guidelines for Designing an Effective Compensation System

1. Payoff must be a major, not minor, piece of total compensation package
2. Incentive plan should extend to all employees
3. Administer system with scrupulous fairness
4. Link incentives to achieving only the performance targets in strategic plan

5. Targets each person is expected to achieve must involve outcomes that can be personally affected
6. Keep time between performance review and payment short
7. Make liberal use of non-monetary rewards
8. Avoid ways of rewarding non-performers

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Lesson 13 - Implementing and Executing Strategy: Culture and Leadership

Build a Strategy - Supportive Corporate Culture | What Makes Up a Company's Culture? | Where Does Corporate Culture Come From? | Culture and Strategy Execution: Ally or Obstacle? | Types of Corporate Cultures | Creating a Strong Fit Between Strategy and Culture | Establishing Ethical Standards and Values | Building a Spirit of High Performance

Exerting Strategic Leadership | Numerous Roles of Strategic Leaders | Role #1: Stay on Top of What's Happening | Role #2: Foster a Strategy - Supportive Culture | Role #3: Keep Internal Organization Responsive | Role #4: Exercising Ethics Leadership | Role #5: Making Corrective Adjustments

"An organization's capacity to execute its strategy depends on its **"hard" infrastructure**--its **organization structure** and **systems**--and on its **"soft" infrastructure**--its **culture** and **norms**."

Amar Bhide

Build a Strategy - Supportive Corporate Culture






What Makes Up a Company's Culture?

- ▶ Beliefs about how business ought to be conducted
- ▶ Values and principles of management
- ▶ Work climate and atmosphere
- ▶ Patterns of "how we do things around here"
- ▶ Oft-told stories illustrating company's values
- ▶ Taboos and political don'ts
- ▶ Traditions
- ▶ Ethical standards

Beliefs
Values
Traditions
Standards

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Features of Corporate Culture at Wal-Mart	
	<ul style="list-style-type: none"> • Dedication to customer satisfaction • Zealous pursuit of low costs • Belief in treating employees as partners • Sam Walton's legendary frugality • Ritualistic Saturday morning meetings • Executive commitment to • Visit stores • Talk to customers • Solicit employees' suggestions
Features of Corporate Culture at General Electric	
	<ul style="list-style-type: none"> • Hard-driving, results-oriented atmosphere prevails <ul style="list-style-type: none"> ◦ All businesses are held to a standard of being #1 or #2 in their industries as well as achieving good business results • Concept of boundaryless organization exists • Reliance upon "workout sessions" to identify, debate, and resolve "burning issues" • Commitment to Six Sigma Quality • Globalization of the company
Features of the Corporate Culture at Nordstrom's	
	<p>Company motto</p> <p>"Respond to Unreasonable Customer Requests"</p> <ul style="list-style-type: none"> • Out-of-the-ordinary customer requests viewed as opportunities for "heroic" acts • Promotions based on outstanding service • Salaries based entirely on commission • Weeds out those not meeting or living up to standards/expectations/shared values and rewards those who do

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Where Does Corporate Culture Come From?

- Founder or early leader
- Influential individual or work group
- Policies, vision, or strategies
- Traditions, supervisory practices, employee attitudes
- Organizational politics
- Relationships with stakeholders
- Internal sociological forces



How Is a Company's Culture Perpetuated?

- Selecting new employees based on how well their personalities "fit" in



- Systematic indoctrination of new employees
- Senior employees' reinforcement of core values
- Story-telling of company legends
- Ceremonies honoring employees who display cultural ideals
- Visibly rewarding those who follow cultural norms

Forces and Factors Causing Culture to Evolve

- Internal crises
- Revolutionary technologies
- New challenges
- Arrival of new leaders
- Turnover of key employees
- Diversification into new businesses
- Expansion into different geographic areas
- Rapid growth adding new employees
- Merger with or acquisition of another company
- Globalization



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Culture and Strategy Execution: **Ally** or **Obstacle**?



Culture can contribute to -- **or hinder** -- successful strategy execution

Requirements for successful strategy execution may -- **or may not** -- be compatible with culture

A **close match** between culture and strategy promotes effective strategy execution

Why Culture Matters: **Benefits of a Good Culture-Strategy Fit**

Strategy-supportive cultures

Shape mood and temperament of the work force, **positively affecting** **organizational energy**, **work habits**, and **operating practices**

Provide **standards**, **values**, **informal rules** and **peer pressures** that **nurture** and **motivate** people to do their jobs in ways that promote good strategy execution

Strengthen **employee identification** with the company, its performance targets, and strategy

Stimulate people to take on the challenge of realizing the company's vision, do their jobs competently and with enthusiasm, and collaborate with others to execute the strategy



Optimal condition: A work environment that

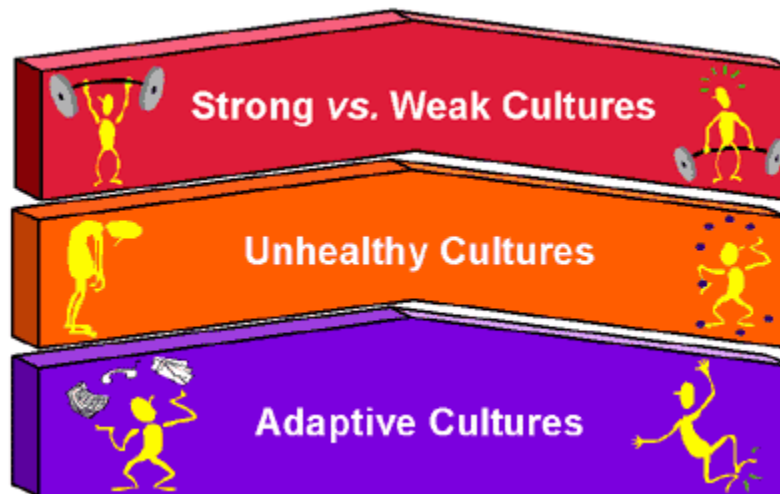
- Promotes **can do attitudes**
- **Accepts** change
- **Breeds** needed **capabilities**

Strategic Management Principle

Anything so fundamental as implementing a new or different strategy involves aligning the organization's culture with the requirements for competent strategy execution!

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Types of Corporate Cultures



Characteristics of Strong Culture Companies



- ▶ Conduct business according to a **clear, widely-understood philosophy**
- ▶ Management spends considerable time **communicating** and **reinforcing values**
- ▶ **Values** are widely **shared** and **deeply rooted**
- ▶ Typically have a **values statement**
- ▶ Careful **screening**/selection of new employees to be sure they will “**fit in**”
- ▶ Visible **rewards** for those following norms; **penalties** for those who don't

[GOTO TOP | TYPES OF CULTURES](#)

How Does a Culture Come to Be Strong?

- ▶ Leader who establishes values consistent with
 - ▶ Customer needs

- Competitive conditions
- Strategic requirements
- A deep, abiding **commitment** to espoused **values** and **business philosophy**
 - **Practicing what is preached!**
- Genuine concern for well-being of
 - Customers
 - Employees
 - Shareholders

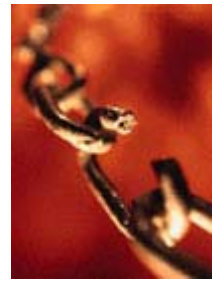
Strategic Management Principle

Strong cultures promote good strategy execution where there's strategy-culture fit and hurt execution where there's little fit!

[GOTO TOP | TYPES OF CULTURES](#)

Characteristics of Weak Culture Companies

- Many subcultures
- Few values and norms widely shared
- Few strong traditions
- Little cohesion among the departments
- Weak employee allegiance to company's vision and strategy
- No strong sense of company identity



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Characteristics of Unhealthy or Low Performance Cultures

- Politicized internal environment
 - Issues resolved on basis of turf
- Hostility to change
 - Experimentation and efforts to alter status quo discouraged
 - Avoid risks and don't screw up
- Promotion of managers more concerned about process and details than results
- Aversion to look outside for superior practices
 - Must-be-invented here syndrome

[GOTO TOP | TYPES OF CULTURES](#)

Hallmarks of Adaptive Cultures

- Introduction of new strategies to achieve superior performance
- Strategic agility and fast response to new conditions
- Risk-taking, experimentation, and innovation to satisfy stakeholders
- Proactive approaches to implement workable solutions

- ▶ Entrepreneurship encouraged and rewarded
- ▶ Top managers exhibit genuine concern for customers, employees, shareholders, suppliers



[GOTO TOP](#) | TYPES OF CULTURES

Creating a Strong Fit Between Strategy and Culture



Step 1

Diagnose which facets of present culture are strategy-supportive and which are not

Step 2

Talk openly about why aspects of present culture need to be changed

Step 3

Follow with swift, visible actions to modify culture - include both **substantive** and **symbolic** actions

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Types of Culture-Changing Actions

- Revising policies and procedures to help drive cultural change
- Altering incentive compensation to reward desired cultural behavior
- Visibly praising and recognizing people who display new cultural traits
- Hiring new managers and employees who have desired cultural traits and can serve as role models
- Replacing key executives strongly associated with old culture
- Communicating to all employees the basis for cultural change and its benefits



Symbolic Culture-Changing Actions



- Emphasize frugality
- Eliminate executive perks
- Require executives to spend time talking with customers
- Alter practices identified as cultural hindrances
- Visible awards to honor heroes
- Ceremonial events to praise people and teams who “get with the program”

Substantive Culture-Changing Actions

- Benchmarking and best practices
- Set world-class performance targets
- Bring in new blood, replacing traditional managers
- Shake up the organizational structure
- Change reward structure
- Increase commitment to employee training
- Reallocate budget, downsizing and upsizing



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Establishing Ethical Standards and Values



- A culture based on ethical principles is vital to long-term strategic success
- Ethics programs make ethical conduct a way of life
- **Value statements** serve as a cornerstone for culture-building
- A **code of ethics** serves as a cornerstone for developing a corporate conscience
- Approaches to establishing ethical standards
 - Word-of-mouth indoctrination and tradition
 - Written documents

Table 13-1: Topics Covered in Value Statements and Codes of Ethics

Topics in Value Statements	Topics in Codes of Ethics
<ul style="list-style-type: none">▶ Customer importance▶ Commitment to quality▶ Commitment to innovation▶ Respect for individual employee▶ Importance of honesty▶ Duty to stockholders▶ Duty to suppliers▶ Corporate citizenship▶ Protecting the environment	<ul style="list-style-type: none">▶ Honesty & observing the law▶ Conflicts of interest▶ Fairness in marketing practices▶ Using inside information▶ Supplier relations▶ Corrupt practices▶ Acquiring information▶ Political activities▶ Use of company assets▶ Proprietary information▶ Pricing, contracting, & billing

[GOTO TOP](#) | [ETHICAL VALUES AND STANDARDS](#)

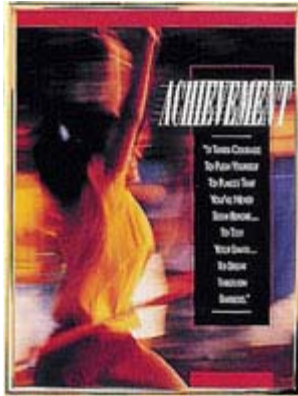
Instilling Values and Ethics in the Culture

- Incorporate values statement and ethics code in employee training programs
- Screen out applicants who do not exhibit compatible character traits
- Communicate the values and ethics code to all employees
- Management involvement and oversight
- Strong endorsement by CEO
- Word-of-mouth indoctrination



[GOTO TOP](#) | [ETHICAL VALUES AND STANDARDS](#)

Building a Spirit of High Performance into the Culture



Emphasize **achievement** and **excellence**

Promote a **results-oriented culture**

Pursue practices to **inspire people to excel**

Desired outcome

Produce **extraordinary results** with **ordinary people**

Approaches to Building a Spirit of High Performance

- Treat employees with dignity and respect
- Train each employee thoroughly
- Encourage employees to use initiative
- Set clear performance standards
- Use rewards and punishment to enforce high-performance standards
- Hold managers responsible for employee development
- Grant employees autonomy to contribute
- Make champions out of people who excel



[GOTO TOP](#) | [BUILDING HIGH PERFORMANCE](#)

People Management Practices That Promote a Spirit of High Performance

- Belief in the worth of the individual
- Strong commitment to
 - Job security
 - Promotion from within
- Managerial practices that encourage employees to exercise individual initiative and creativity
- Pride in doing the "itty-bitty, teeny-tiny things" right

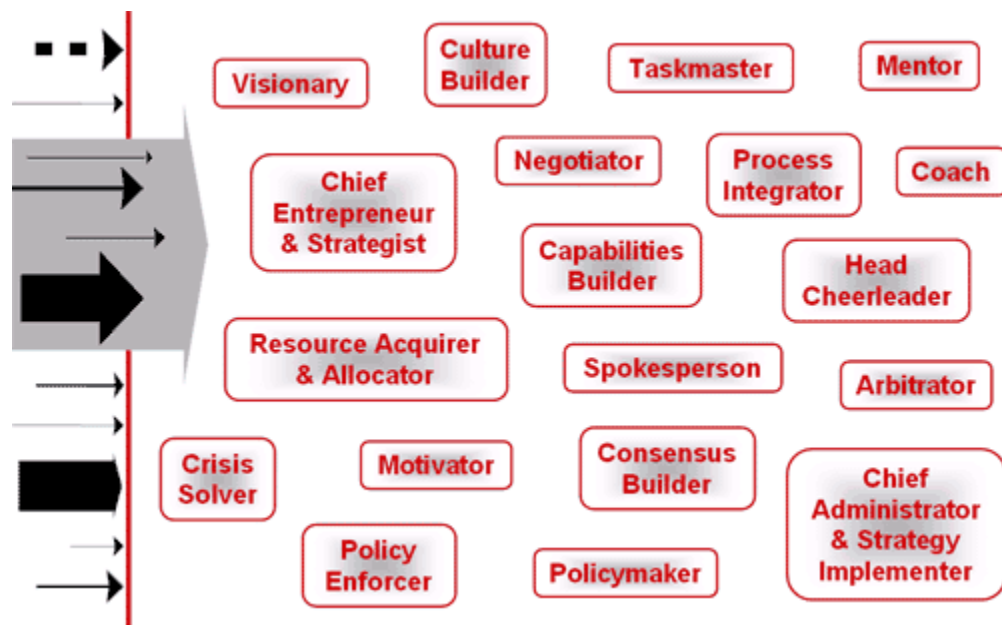


Southwest Airlines celebrates five Triple crown achievements..... with an airplane dedicated to employees

Strategic Leadership



Numerous Roles of Strategic Leaders



Leadership Roles of the Strategy Implementer

1. Stay on top of what's happening
2. Promote a culture energizing organization to accomplish strategy
3. Keep firm responsive to changing conditions
4. Exercise ethics leadership
5. Take corrective actions to improve overall strategic performance



Herb Keller
President, Chairman & CEO of
southwest airlines

GOTO TOP

Role #1: Stay on Top of What's Happening

- Develop a broad network of formal and informal sources of information
- Talk with many people at all levels
- Be an avid practitioner of **MBWA (Management by Wandering Around)**
 - Observe situation firsthand

- Monitor operating results regularly
- Get feedback from customers
- Watch competitive reactions of rivals

[GOTO TOP](#)

Role #2: Foster a Strategy - Supportive Culture

- Successful leaders spend time
 - Convincing organization members chosen strategy is right and competent strategy execution is top priority
 - Nurturing values
 - Building and nurturing a culture promoting good strategy execution



Jack Welch
CEO of General
Electric

Leader's Role in Matching Culture and Strategy

- Implement a “**stakeholders-are-king**” philosophy
- **Challenge status quo** with very “basic” questions
- **Create events** where all managers must listen to
 - **Angry customers**
 - **Dissatisfied strategic allies**
 - **Alienated employees**
 - **Disenchanted stockholders**
- **Energize employees** to make new strategy happen
- **Initiate substantive actions** to reinforce desired cultural traits
- **Reward people** exhibiting desired cultural norms

“When in conflict, Culture will eat Strategy for lunch -- every time!”

paraphrased from Mark Bard,
MD

[GOTO TOP](#)

Role #3: Keep Internal Organization Responsive

- Promote openness to fresh ideas
- Pursue attractive new opportunities
- Support people who are willing to champion
 - Innovative ideas and products
 - Better services
 - New technologies
- Promote continuous adaptation to changing conditions
- Build new competencies and capabilities



Leader's Role in Empowering Champions

- Encourage people to be creative and imaginative
- Tolerate mavericks with creative ideas



- Promote lots of tries and be willing to accept failures (most ideas don't pan out)
- Use all kinds of organizational forms to support experimentation (venture teams, task forces, "skunk works" and individual champions)
- See that rewards for successful champions are large and visible

Leader's Role in Developing New Capabilities

- **Responding to changes requires top management intervention to establish new**
 - Organizational capabilities
 - Resource strengths and competencies
- **Senior managers must lead the effort because**
 - Competencies reside in combined efforts, requiring integration
 - Clout is needed to enforce necessary networking and cooperation

[GOTO TOP](#)

Role #4: Exercising Ethics Leadership

- Display unequivocal commitment to ethical and moral conduct
 - Insist upon strong code of ethics
- Encourage compliance and establish tough consequences for unethical behavior
- Make it a duty for employees to
 - Observe ethical codes
 - Report ethical violations



Manager's Role in Exercising Ethics Leadership

- Set an excellent ethical example
- Provide training to employees about what is ethical and what isn't
- Reiterate unequivocal support of ethics code
- Remove people from key positions if found guilty of a violation
- Reprimand people lax in monitoring ethical compliance

Key Approaches to Enforcing Ethical Behavior

- Conduct an annual audit to assess
 - Each manager's efforts to uphold ethical standards
 - Actions taken by managers to remedy deficient conduct
- Require all employees to sign a statement annually certifying they have complied with company's code of ethics

Actions Demonstrating Corporate Citizenship and Social Responsibility

- Having “family friendly” employment practices
- Operating a safe workplace
- Taking special pains to protect the environment
- Taking an active role in community affairs
- Interacting with community officials to minimize impact of
 - Layoffs or
 - Hiring large numbers of new employees
- Being a generous supporter of charitable causes and projects that benefit society



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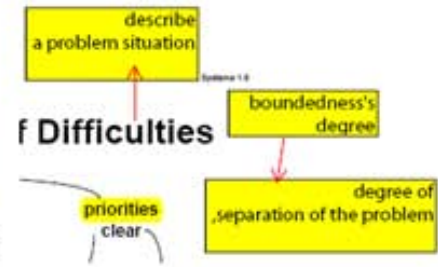
Role #5: Lead the Process of Making Corrective Adjustments



- Requires both
 - Reactive adjustments
 - Proactive adjustments
- Involves
 - Reshaping long-term direction, objectives, and strategy to unfolding events
 - Promoting initiatives to align internal activities and behavior with strategy

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Ackoff's classification of problem situations is that we require different approaches to problem solving for difficulties than for messes.

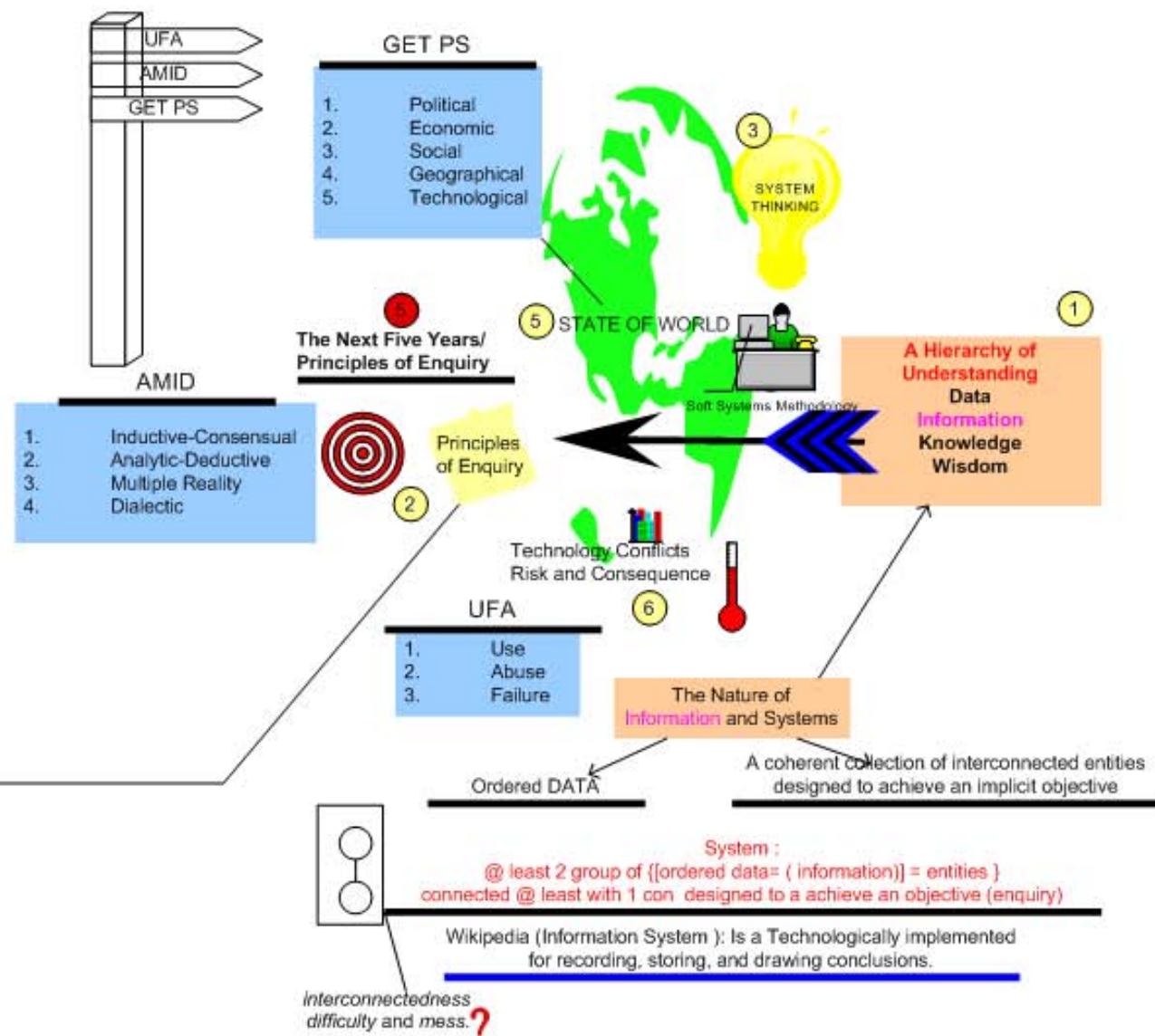
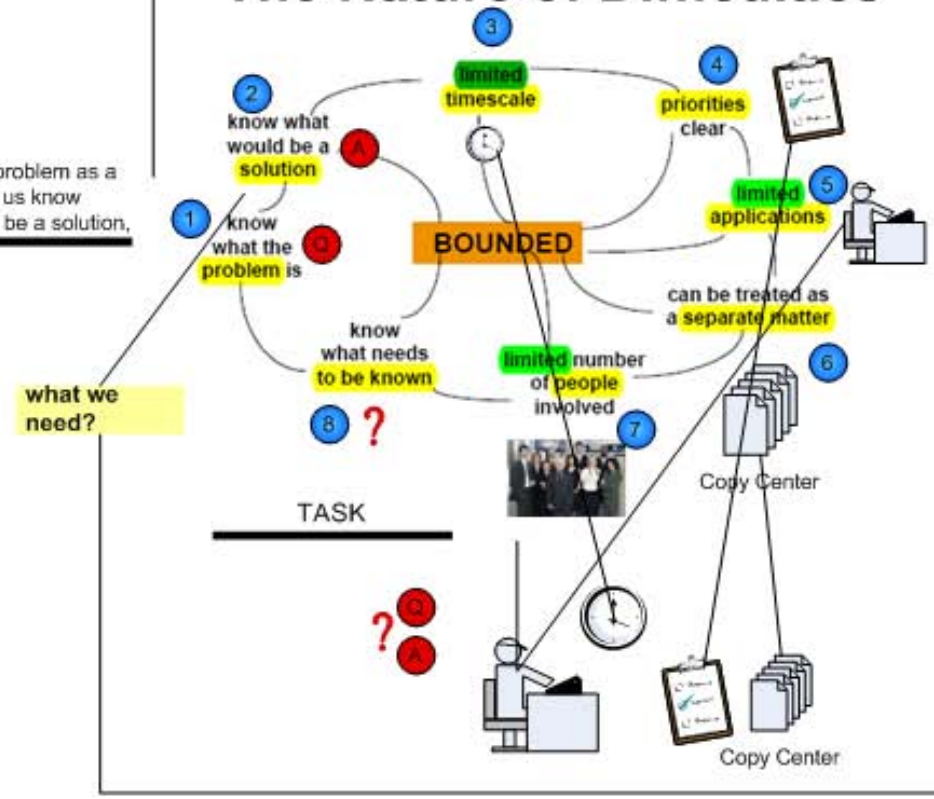


A 'mess' is a system of interacting problems

Messes

The Nature of Difficulties

Treating a problem as a difficulty let us know what would be a solution,



Supporting structures for evolving systems development: a case study

Carl Adams

Department of Information Systems and Computer Applications
University of Portsmouth, UK
E-mail: carl.adams@port.ac.uk

Abstract: Information systems evolve. Evolution takes place throughout all stages of an information system from development to early use and to a mature 'legacy' status. During development users and developers learn about the problem domain and refine requirements. When using a system, users learn about it's the system's capabilities and possibilities resulting in further evolving requirements. The dynamic business environment also initiates modifications to system attributes. This paper looks at this dynamic environment of development and examines how development teams can address these evolving and uncertain system requirements. A case study is used as a sample to identify structures that support such system evolution. At least for the case study, social and informal structures provide much support to address the uncertainties of development.

Keywords: evolving information systems; change and uncertainty in information systems development.

Reference to this paper should be made as follows: Adams, C. (2005) 'Supporting structures for evolving systems development: a case study', *Int. J. Information Technology and Management*, Vol. 4, No. 4, pp.423–442.

Biographical notes: Carl Adams has several years of experience as a Software Engineer and Systems Analyst before obtaining an MSc in Management Science and a PhD in Information Systems from Southampton University, UK. He is currently a Principal Lecturer at Portsmouth University, UK.

1 Introduction

Information systems can be thought of as evolving, and this evolution takes place throughout the different stages of their development, from early use to a mature 'legacy' status. For instance, during the actual development process, developers are likely to be in the process of learning about the problem domain and user requirements. At the end of the development the 'final' system may be considerably different from that originally envisaged by the developers. Even when the information system starts to be in use, the users continue to learn about the information system and its capabilities and possibilities. Users may start using the system differently from that which was originally designed or may identify useful modification and enhancements. Further, the environment with all its business, technology, legal and social changes is also likely to initiate modifications to system attributes. Indeed, a successful information system is likely to be one that endures a lot of change, modification and enhancement as it evolves.

Information systems developers are faced with many challenges when developing systems. One challenge they have to face is the technical aspect of producing robust complex artefacts that suitably address user requirements. Another challenge is the problem of actually identifying user requirements, an activity that becomes more challenging as the requirements change and evolve over time. This paper looks into this dynamic and challenging development environment and examines how development teams can address these changing and uncertain system requirements. A case study is used to identify appropriate structures that support a continual change or the evolution of an information system. The development team under study was going through a period of change both in a new project 'porting' a system to a new platform as well as addressing continual spec changes to the supported existing systems at the time the research was done. Additionally, the case study was seen as a good example of a development team that deals with change.

The rest of this paper is structured as follows: First the changing development environment is examined together with the different approaches to address them. Then organisational issues are examined particularly possible structures that support addressing evolving requirements within dynamic environments. The paper then describes a case investigation of such a supporting structure. Finally the paper concludes with some discussion on likely structures to support the successful evolution of information systems.

2 The changing development environment

A development environment can be complex and dynamic. As Adams identifies:

"The development process often involves complex relationships between distinct groups of people, including users, developers (*e.g.*, analysts, designers, programmers), system owners (*i.e.*, the people paying the cheque) and other stakeholders. The interrelationship between these groups of people affect the uncertainty (possibly increasing it, possibly changing its scope, possibly making it more complex)." (Adams, 2002)

Further, as Wastell identifies (Wastell, 1996; 1999), developers have to go through a learning exercise where they have to learn about systems attributes, constraints and requirements, within this complex environment. The focus of Wastell's study is on the learning activities that developers need to undertake to ensure a successful development as well as the role of development methodologies and techniques in this learning activity. Development tools and methodologies provide much support in identifying system requirements and system attributes; however, Wastell also notes that the rules of the methods and techniques can become more important rather than the task of addressing the 'real' problems and uncertainty of development itself. This seems to be more of a problem when the environment becomes increasingly uncertain or the methodology or technique is prescriptive. Along the same theme, Adams and Avison (2003) discuss the role of development tools, identifying the strong influence such development tools play in 'blinkering' and biasing understanding. So development techniques and tools offer essential support to developers in understanding the problem domain and initial requirements. However, such tool may also interfere with understanding. In addition, most tools are aimed at identifying initial requirements and not the continual changing and evolving requirements.

Another approach to address the dynamic nature of development and reduce the amount of uncertainty within information systems development is to improve planning activity. Galliers (1987) considered adequate planning, or lack of it, as the single most important issue facing information systems managers. Galliers' work compares planning activity between the UK and Australia, and also provides a fairly comprehensive study of planning works and activity. The planning activity mainly addresses known and identifiable requirements and likely changes, and aims to develop systems of planned identified requirements. However, the unforeseen changes and longer-term system evolution are not well addressed. A theme was taken up by Glass (1991) who notes that 'no one can solve any problem where the nature of the problem is changing. Not software people, not anyone'. Glass's focus was on software failure, and identified 'unstable requirements' as a particularly major problem. The changing nature of requirements calls for flexible approaches to development (and according to Glass), getting the customers to pay for the changes. A further view on software failure is provided by Lyytinen and Hirschheim (1987) who produced a fairly comprehensive study of existing works. They identified four major categories, namely: Correspondence failure, Process failure, Interaction failure and Expectation failure. However, they classified the first three categories to 'constitute special instances of an expectation failure, reflecting specific interests of a powerful stakeholder'. Effectively, they defined computer failure as the inability of an information system to meet a specific stakeholder group's expectations. However, they also noted that different stakeholders are likely to exert influence at different stages in the information system's life. In addition, stakeholders' needs and expectations are also likely to change, a theme taken up by Connell and Powell (1992), who argue that the notion of success or failure can be viewed as dynamic over time. According to them, 'it is not clear what constitutes success, how success should be measured, nor if success criteria are stable over time and between projects'. A system in the 1980s similar to a system in the 1990s would have been measured against a different set of criteria. Adams (2002) uses the analogy of Maslow's hierarchy of needs, which show that individuals and groups have their own hierarchy of importance and that as soon as one set of needs is satisfied another set becomes important. Though these works on computer failure show where some of the problems are, they give little support in addressing the problems, particularly the evolving requirements and stakeholder expectations.

A further approach to address the dynamic nature of requirements is to try to predict what will change and how requirements will evolve. One such approach was taken by Land (1982) in his *future analysis*. The future analysis consisted of two stages. The first attempted to discover potential changes which might have had an impact on the information system, by classifying changes in the major categories of technology, legal requirements, economic/environmental factors, attitudes and expectations and within the organisation. For each of the categories a multidisciplinary team was involved in identifying the possible changes. The second stage used Stage 1 outputs to assess the kind of future the information system would have to face and included items such as 'what and when are conceivable changes likely to occur', 'what impact would they have on the system' and, 'what could be the probabilities of the changes'. The result of using future analysis was a prediction of likely and possible scenarios and greater insight into the dynamic environment of development. Avison *et al.* (1994) continued Land's future

theme by arguing that future requirements need to be considered, identified and, where possible, incorporated in information systems development. Fitzgerald (2000) also continues Land's future theme by looking at adaptability and flexibility in information systems development, suggesting that:

"Although the overall percentage effort devoted to maintenance and enhancement has declined, that devoted to enhancement is a large proportion of that total. It may be that systems are getting better at meeting the original requirements but that these systems are requiring more change." (Fitzgerald, 2000, p.17)

Along the same lines, Galliers (1993) proposes a Business Process Reengineering (BPR) approach to developing flexible information systems architectures. 'Predicting' likely futures, developing flexible designs and architectures, along with flexible BPR approaches, help in addressing the evolution of information systems. However, it is unlikely that developers can predict all likely changes and requirements. Indeed some requirements may only arise after the information system has been in use and the users have the understanding to articulate the evolving business needs.

Another approach is to examine how developers address the changing and uncertain requirements, particularly how developers make decisions in an uncertain environment. Lauer (1996) looked at decision making under risk by project managers and, examined the managers' responses to see if they were more consistent with prospect theory or a more rational Expected Utility Theory (EUT) approach. Lauer's study used a questionnaire administered to 68 software project managers. The questions were adaptations of the ones developed in the psychology field by Kahneman and Tversky (1979) on prospect theory but with an information systems theme. In fact the questions were based on Brooks' mythical man-month essay (Brooks, 1982) (*i.e.*, throwing manpower at a problem). The results showed that decisions were more consistent with prospect theory, such as general risk-averse and different approaches to risk in win-and-losing situations, with managers tending to be more open to taking risks in losing situations (*i.e.*, if they were already behind schedule). Disappointingly, there was little follow up on this study, particularly, in probing deeper into the reasons behind the decisions of project managers. The concepts of uncertainty, risk and other related terms are interwoven. Examples of other works which use uncertainty synonymously with the other concepts include uncertainty and inconsistency (Gabbay and Hunter, 1991; Ferguson *et al.*, 1985; Ganzach, 1994; Hunter, 1996), risk and risk management (Lyytinen *et al.*, 1996), conflict (Janis and Mann, 1977) and, ambiguity and equivocality (Pondy *et al.*, 1988; Kashima and Maher, 1995). In addition, the uncertainty and evolution within information systems development probably have to be considered within the wider context of changes within society. Since the 1970s and 1980s business and society in general seem to be interested in risk management and risk assessment, particularly in the use of objective risk measurement instruments and discernment of 'acceptable' levels of risk (Royal Society, 1983; 1992). Society has been getting more aware of risks and uncertainties – a theme taken up by Beck and Giddens in their seminal works on the risk society (Beck, 1992; Giddens, 1991).

All the above approaches offer something in either understanding, designing flexible systems and approaches to risk taking or addressing some likely identified changes. However, none of these approaches seem to offer a full solution to address the evolving system requirements, and they fall short mostly in addressing unforeseen changes and requirements, which presumably will be more of an issue the longer an information

system survives. To understand how development, and possibly more appropriately maintenance, teams address the unforeseen changes will require a closer examination of how groups deal with changes and uncertainty. To do this will require examination of the structures within organisations, particularly those that may impact on group interaction and problem solving. This will be covered in the next section.

3 Organisational structures within development

Hutchison and Rosenberg (1994) consider the organisational context and influences of the information systems' use and development. They recognise that there are many views of what constitutes an 'organisation' but they adopted Huczynski and Buchanan's definition that 'organisations are social arrangements for the controlled performance of collective goals' (Hutchison and Rosenberg, 1994,p.7). Hutchison and Rosenberg distinguished between the overt structure (O-structure), such as the formal organisation, and covert structure (C-structure), like informal organisation. They discussed the complex relationship and influences between the O-structure and the C-structure in terms of what constitutes the organisation, existing structures and particular positions and roles within the organisation. They argued that:

"The successful design of NGIS [group information systems] must be founded upon an understanding of the social and organisational setting of work, and of the distinction between the abstract ORGANISATION and the concrete STRUCTURE, as well as between OFFICE and ROLE [and] the formal modelling not of a single user (problem solver) but of the whole work group."

In their work they focused particularly on information systems to address group activities and processes. Key to their work is the concept that group activities have a strong social dimension. This is a theme taken up by Bloomfield (1992) who also discusses the social aspects of development by drawing on MacKenzie and Wajcman's (1985) work on the sociology of technology. Bloomfield describes the 'social' within the 'technical' development practice and argues for an understanding of 'the social practices underpinning computer science techniques' (MacKenzie and Wajcman, 1985,p.204). An information systems development project will have (at least) two distinct social arenas, that of the development team focused on the technological practices and that of the organisation itself.

"[There is] an evident tendency towards a proliferation of methodologies within the area of information systems. The perspective adumbrated here would suggest that the root of the problem facing systems developers does not lie so much in the lack of the right method but, rather sociologically impoverished views of organisations and management, and above all their own practices." (Bloomfield, 1992,p.205)

Fortune and Peters (1995), taking an overall systems view of failures, discussed some of the complex factors and human interactions affecting decision making within organisations. They examined these complex factors at three levels: the organisational, group and the individual level. They used the concept of *cognitive adequacy* (Westrum, 1988) to show how organisational level factors are likely to dictate many of the operations and processes within an organisation. For instance, the organisational structure and culture are likely to dictate who has responsibility for what kinds of actions, what is

appropriate conduct for various positions, what and how information is communicated, what is considered as fixed or changeable, and how problems are addressed. Fortune and Peters discuss the strong level of group influences, which can result in *group think* (Janis and Mann, 1977) and group consensus dictating actions within the group. The influences at group level are further complicated when one considers that groups develop over time. Stewart (1991) describes three distinct stages of a group development: first as a new team start-up, then the team developing as a distinct entity, and finally the team as well established. Decision making is likely to be affected by the stage of the group's development, with well-established teams developing a strong team culture and team cohesiveness becomes more important than the individual. Embryonic teams, made up of a newly formed collection of individuals, may find there is uncertainty over what the team is meant to be doing and the scope of their authority, resulting in "continuous checking of work and decisions" (Stewart, 1991, p.140). Fortune and Peters' work is particularly relevant to the understanding of the strong influences (often pulling in different directions) affecting individual decision making, at project team level and at the organisational level.

Sauer (1993, p.4) developing a model of information systems failure focuses on three dimensions within the organisational context, these being the project organisation, the information system, and its supporters. These are then arranged into a *triangle of dependencies*, which are used to illustrate the dynamic processes that can lead to failure. Sauer refers to the fluid nature of information systems development processes, in which a final system may vary considerably from its initial conception:

"An information system is an organisational resource the responsibility and control for which can shift over time. Different groups can be involved in the innovative process at different times, each trying to make it an effective resource for them. As interests and stakeholder groups change, so the characteristics of the system may be adjusted accordingly." (Sauer, 1993, p.12)

The picture painted here is one of a dynamic process, with dynamic interaction between stakeholder groups impacting the changing and uncertain requirements.

Drawing upon the above literature it seems that there are several approaches to address evolving system requirements and uncertainty. However, the approaches examined here do not offer a full solution, particularly falling short in addressing unforeseen changes and requirements. The above works on organisational structures and team processes indicate that addressing unforeseen changes and associated problem solving will require interaction within the development team itself and with the variety of stakeholders. Consequently the development team will require suitable support structures to enable this interaction. Furthermore, as the above discussion highlights, the interaction is likely to involve formal and informal aspects. The next section describes a case study in which the supporting structures are examined.

4 Research: case study and research approach

The research aimed to identify how developers address the changes and uncertainties of development practice and evolving system requirements. A case study is used consisting of observations and interviews within a real development project. This research can be classed as a broadly 'interpretive' in approach (Neuman, 1997; Walsham, 1993).

The case study was initiated through contact with a senior manager at the blue chip company from whom we sought permission to conduct the interviews and observations from appropriate authorities within the company (*e.g.*, from the public relations function, senior management and a willing development team). The interview and observation sessions were due to take place in late October or early November 2000. Permission was sought, and granted, provided specific commercial development details and the identity of participants were kept confidential. Consequently, actual names of individuals could not be used and questions were restricted to ensure that no commercially sensitive material was disclosed. A draft of the written-up case study was forwarded to the project manager and development team for their approval.

The interviews took between one-half to one-and-a-half hours and were based on a set of structured questions. All but one of the interviewees was happy to have the interview recorded on audiotape. The recording was done on the agreement that interviewees could keep the audiotape if they were not happy with the recording. All respondents were happy and no one asked to keep their recorded interviews. In addition, written notes and mnemonics were taken on blank questionnaires. For the interviewee who did not wish the interview to be recorded, more substantial notes were taken. The time and place of interviews were negotiated with individual member of the team and the team leader. For one of the developers who worked off-site during the interview sessions, the interview was conducted over the telephone. Again, the interview was recorded.

The development team consisted of a project leader and seven software developers. One of the software developers did not wish to participate in the interview sessions but was happy to be observed with the others. In addition, interviews were conducted with the senior manager who had overall responsibility for the project and a support analyst who stayed nearby and interacted frequently with the team members. The audio recordings enabled a free flow of answers to be recorded, backed up with hand-written notes. Observations took place throughout the visits. The observations aimed to note the interactions and dynamics within the group and to examine communication structures within the group. Observations also provided a means of comparison with the structured questionnaire responses. The intention was to get a 'feel' of normal group interaction among members of the development team rather than go through a detailed observation of 'every' development activity, since it is recognised that observations only provide a limited glimpse of activities. Observation sessions usually took a whole morning or afternoon, usually once a week, and spanned approximately two months.

The blue chip company chosen for the case study is a market leader in software products and services. The development team was involved in porting a new version of an existing product into a new and technically different platform as it contended with continual updates to existing systems. During the interviews and observation sessions, the project completion was scheduled for a further four or five months. The development team was particularly suited for the research since they were described as a 'good example', seemingly coping well with a changing and dynamic environment. The 'team' was mature in that most of the team members had been working together for the previous 18 months and had clear idea of their roles and responsibilities.

5 Structured questionnaire development

The questionnaire used as the basis for the interviews consisted of three parts. The first part contained questions on previous work of team members and team interactions. The second part contained questions on risk and planning orientation, and the questions distinguished between individual and group aspects. The third section contained questions on how uncertainty and general problems are addressed. These were aimed at eliciting information on the 'process' of dealing with uncertainty and changing requirements.

The questions on risk and planning orientations aimed to examine decision making in lose scenarios where projects were running behind time schedule. The first scenario involved a project running one *month* late, a moderate losing situation, whereas, the second involved a project running one *year* late, a more pronounced losing situation.

What followed was a set of three questions revolving around dealing with problems in general, and around inconsistencies and uncertainties. As discussed, there was a potential problem in the use of language to describe elements that initiate changes so three overlapping concepts: 'inconsistencies', 'uncertainties' and 'problems', were used to elicit information on how such changes were addressed. Each set of questions included "Do you encounter many *problems/ inconsistencies/ uncertainty* in your work?", "What form do they usually take?" and "How would you try and resolve them?". Specific examples were also sought aiming to provide a focus for discussion. The questionnaire was concluded with a set of questions looking at the relative proportions of individual and group involvement to resolve *problems, inconsistencies and uncertainties*.

The next table contains a summary of responses to questions on team interaction.

Table 1 Team/group interaction overview

<i>Respondent</i>	<i>Interaction within team</i>	<i>Interaction outside team</i>	<i>Teamwork important</i>
I1	Yes, lots ...	Yes	Yes
I2	Yes, a lot of interaction ...	Not very much...	Yes
I3	Yes, quite a bit	Not a lot for this team role, yes for other team role	Has to be in this case... lots of dependencies
I4	Yes	Yes	Within team, yes outside, less so
I5	Yes, certainly	Not a great deal – sometimes	Yes
I6	(Currently) not really – except for specific tasks. (Mainly involved in distinct tasks) – earlier tasks far more interactive	Very rarely, normally for expert discussion or project direction	Yes it is

Table 1 Team/group interaction overview (continued)

Respondent	Interaction within team	Interaction outside team	Teamwork important
17	(actually part of other team)	Yes. Service team more interaction with development team than service team	Yes and no. Yes for dealing with a problem [able to] pick up what is going on and ideas
18	Yes, do work at home 2/3 days a week, but have regular telephone meetings .. (plus) face-to-face-meetings	Some ... with support team + social	Yes, without team difficult to ...
19	Yes. Open door policy so as much as (Team A) wants, other team in Boston but visit 'regularly'	Yes, customers and peer group of other project managers	Absolutely, vital

Some relevant responses to questions on team interactions follow:

- "Yes, there is a lot of interaction within the team ... team meetings once a week, regular coffee meetings ..." (I2)
- "Its a close knit team of 8 We sit next to each other ... service people and developers sit close together so there are close links... [there is] a jovial relationship between people ..." (I1)
- "Team work is important ...a problem requires team effort... Coming to work is a social thing ... I need to work with people ..." (I1)

What form of interaction usually takes place?

- "Generally need to talk to people, sometime find a room, ... mostly informal" (I5)
- "If work on own [then] feel very isolated ... good to get team interaction" (I5)
- "Open door", "need to be available and flexible", "within the team it is very important, ...outside it is less so ...need to clarify requirements" (I4)

6 Summary of scenario responses

Table 2 presents the comparison of responses to questions on risk and planning orientations for the two scenarios. It is interesting to note the willingness of the participants to take risks to get a project back on schedule. For instance, responses for d) and i) had only a 10% chance of success for both, and although the majority of respondents were unwilling to take the gamble, there were a few who were willing to take the risk. In this case there is slightly more inclination to take the gamble in the second scenario than in the first (MY to 2MY and 6SN to 3SN), which may be consistent with diminishing sensitivity (however, direct comparison is not possible given the different expected values). It is particularly interesting to note the number of 'depends' responses. The responses indicate that contextual influences are very strong for this team,

particularly as regards the wider consequences of decisions, scope of decision and how decisions would affect other groups. Taking upfrom this, respondents were then asked whether they were happy to make these decisions totally on their own. A summary of the responses is given in Table 3.

Table 2 Comparison of responses for the two scenarios

First scenario, 1 month behind schedule		Second scenario, 1 year behind schedule	
Situation	Responses	Situation	Response
a) 50:50 chance of being on schedule, possible slip of one week	2MY, 3Y, 2SY 2MN MD, 5D		
b) 50:50 chance of being on schedule, possible slip of one month	MY, 2Y 2MN, N, SN 2MD, 3D, 3SD	f) 50:50 chance of being on schedule, possible slip of one year	2MN, N, 2SN MD, 2D, 4SD
c) 60:40 chance of one month ahead of schedule, possible slip of one month	4MY, 2Y, SY MN, N 6D, SD	g) 60:40 chance of one month ahead of schedule, possible slip of one month	MY, 4Y, 4SY 2MD, D
d) 10:90 chance of being on schedule, possible slip of one week	MY MN, N, 6SN 2D, SD	h) 10:90 chance of being on schedule, possible slip of two months	2MY MN, 2N, 3SN 3D, SD
e) 90:10 chance of being on schedule, possible slip of one week	4Y, 5SY MD	i) 90:10 chance of being on schedule, possible slip of two months	3Y, 6SY 2D
Notes: Key: MY = mild yes Y = yes SY = strong yes MN = mild no N = no		SN = strong no MD = mild depends D = depends SD = strong depends	

Table 3 Summary of responses to 'Happy to make decisions on own?'

Respondent	Happy to make decisions on own?
11	No, in a project it is more a team effort ...
12	No, would like to discuss with other interested parties ...
13	No
14	Would not be too happy ...
15	Would consult with ...
16	Yes
17	Some, not all ..Would expect involvement of others
18	Not really (at the moment ... need more experience)
19	Yes. But would receive input from team.

Clearly from the responses there is an expectation that such decisions would be made with, at the very least, consultation with other parties, *i.e.*, project risk decisions are likely to be 'group' decisions in that there is group consultation beforehand. However, once this consultation had taken place, then people were generally willing to make the decision themselves.

Some relevant quotes:

"need input (and discussion) from team Job of manager" (I8)

"would consult with (line manager) at time ... probably consult with appropriate (people)" (I5): "would expect input from others" (I6)

"would not be too happy ... might be willing to ...(in) reality, would not be able to (make decisions on own) ...prefer to do with other's involvement ... depends, need to talk to other people ...(but, given these) would be happy to, yes. ... Where definite (quick) decision needed then OK to make decision, otherwise need more balanced view – need more people involved" (I4)

"(would expect involvement) from customer, they should be involved most",

"not really a decision (totally) for a single person (lots of people involved)" (I3)

"depends on feeling of team ... in a project it is more of a team effort..." (I1)

Generally, the team members would expect to receive input from and consult with other team members and affected parties before making these types of decision. However, several seemed happy to make the decision themselves, once the consultation had taken place. The next main section contained questions on dealing with problems, inconsistencies and uncertainty. For each, questions were asked on how often the situations were encountered and how they were addressed. The following three tables summarise the responses.

Table 4 Responses to dealing with problems

<i>Respondent</i>	<i>Do you encounter many problems in your work?</i>	<i>What form do they usually take?</i>
I1	Some, not a lot	Usually technical
I2	Some	Generally S/W not working
I3	Not many within this group	Tend to be quite minor ...
I4	Yes	1) code badly written 2) bugs 3) unnecessary obstacles to get the job done
I5	Yes, a fair few ...	Mainly technical related
I6	Yes	Logic problems, design problems
I7	Yes	Not able to generate the problem the customer has reported
I8	Yes, in development work and support work	1) service type ones (failure for some specific reason) 2) problems in development – due to lack of understanding of system
I9	Yes	(From) customers, unforeseen areas of work or technical problems. People problems sometimes

Table 5 Responses to dealing with inconsistencies

<i>Respondent</i>	<i>Do you encounter many inconsistencies in your work?</i>	<i>What form do they usually take?</i>
11	No, not really - more uncertainties	
12	Rarely ... not really at the moment	
13	Not now, ... most (elements) becoming standard	
14	Yes	Would use the term 'bug'
15	Some	(In other people's work)
16	Not really	
17	Not many	(type of work activity, limited inconsistencies)
18	Yes	On a major systems document .. two places trying to document same thing
19	Yes	Between product sets, between working hours, staff

Table 6 Responses to dealing with uncertainty

<i>Respondent</i>	<i>Do you encounter many uncertainties in your work?</i>	<i>What form do they usually take?</i>
11	Some	Lack of information
12	Sometimes, yes	Not sure S/W will work
13	Occasionally	Software upgrades resulting in strange results
14	Yes	Examples given
15	Yes, quite a lot ...	(specific examples given)
16	No (but gave example(s))	Didn't know (likelihood of event)... Lack of knowledge
17	Not many, except spontaneity of task/job	
18	Yes, in planning stage ... big uncertainties then	Lack of knowledge in what needs to be done
19	Lots, absolutely More so than the team	Customer driven

Overall, several examples for all three types of situations were given and discussed by the respondents. There are clear elements of iterative processes to address the uncertain, inconsistent or problem situations, typically involving other members of the team or users. This was further taken up with the next set of questions focusing on the amount of individual and group involvement expected to address the uncertain, inconsistent or problem situations. The following three tables summarise the responses.

Table 7 Summary of proportion of individual/group involvement for problems

<i>Respondent</i>	<i>Proportion of problems solved with individual effort</i>	<i>Proportion of problems solved with group effort</i>
11	Mainly 75%	25%
12	75%	25%
13	80%	20%
14	50%	50%
		more for harder problems
15	80%	20%
16	90%, most	10%
17	In terms of time 80%	20%
	In terms of numbers 90%	10%
18	60 %(70?)	40 %(30?)
		20% brief ideas with team
		20% more team effort
19	Depends on problem	
	A) if mine 90%	A) 10%
	B) if teams 20%	B) 80%

Table 8 Summary of proportion of individual/group involvement for inconsistencies

<i>Respondent</i>	<i>Proportion of inconsistencies solved with individual effort</i>	<i>Proportion of inconsistencies solved with group effort</i>
11	(Not many examples)	
12	25%	75%
13	50%	50%
14		Most
15	50%	50%
16	10%	90%
17	10%	90% 'virtually all (but doesn't really apply in current position)'
18	Depends on magnitude	
	Small: high	Small: low
	Medium:	Medium:
	Large: Very low	Large: Very high
19	Depends on type	
	20%	80%

Table 9 Proportion of uncertainties solved with group effort

Respondent	Proportion of uncertainties solved with individual effort	Proportion of uncertainties solved with group effort
11		Mostly
12	25%	75%
13	50%	50%
14		100%
15	40	60
16	Depends on scope, Within own scope/control then, most 90%	10%
	Outside scope 10%	90%
17		100%
		'have to talk to someone else'
18	Almost entirely individual	
19	Product: 20%	80%
	Staffing etc.	
	25% ish	75% ish (75/80)

Overall, the responses to the questionnaire show a range of individual attitudes towards risk taking and planning. Also, responses indicate strong contextual and social/group influences on risk or planning decisions.

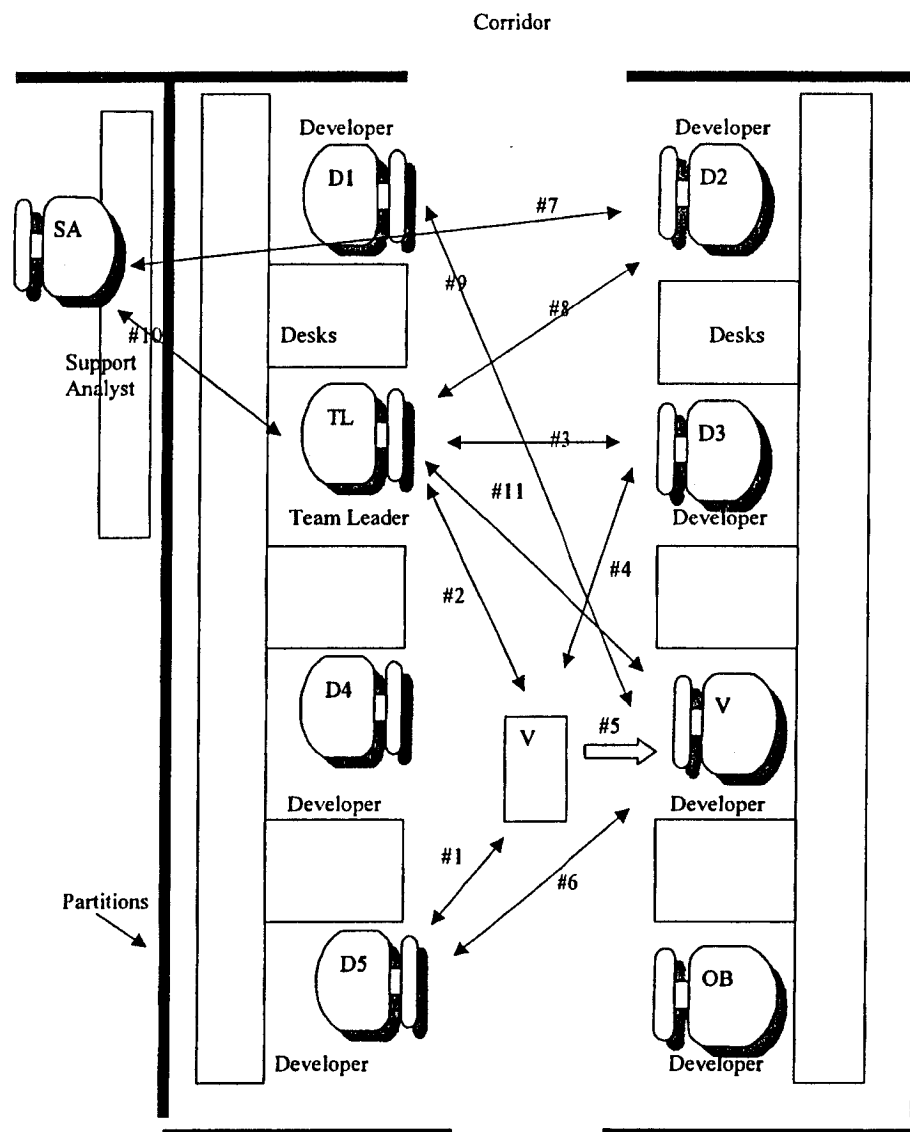
As discussed, the team was presented as a 'good development team' where team members worked well together and where the project was progressing successfully. The main aim of the observation sessions was to examine the interactions and dynamics within the group, and the structures supporting (or otherwise) group interaction that enabled the team to address their changing environment. Though only providing a glimpse of the activities of the development team, it did provide a window into the general group working environment and interaction.

Many of the observation sessions spanned 'coffee breaks', which seemed to be planned 'team' activities. It seems that there are usually two such coffee breaks in a day, one in the mid-morning and one in the mid-afternoon (though team members could also have coffee whenever they wanted). These coffee breaks would involve most of the team members moving together to the canteen which was situated along a network of corridors. Typically the coffee breaks covered social interaction and discussion, however, approximately half of the discussion observed in these sessions were work related.

The most striking characteristic of team interaction during the observation sessions was the general *open door* approach, which was present at all levels in the team, from overall manager to team leader to individual developers. It was also manifest in the seating arrangements and open layout of the office. The team leader and seven developers occupied a rectangular area, delimited by partitions. Four people were seated on either side of the area facing the partitions with a passageway in between. Additionally, the support analyst, who interacted with the team most of the time, was located in an adjacent section on the other side of one of the partitions. The project manager with overall responsibility stayed in a nearby office.

The observed incident shows how the team addressed a problem involving someone from another team asking for some information and general help with 'their' problem. The interaction described was similar to other incidents observed.

Figure 1 Interaction diagram for example incident



Key to Figure 1

People	
D1 to D5	= developers
TL	= team leader
V	= visitor
SA	= support analyst
OB	= observer
Events	
1	The initial incident consisted of V coming into the developer's area and starting some social banter with D5. In addition, greetings were exchanged between the visitor and the TL and D3 – with 'swivel chair' movement. The social banter/interaction lasted six minutes. From this V asked D5 a specific technical question.
2	This resulted in TL participating in the discussion with D1 and V.
3, 4, 5, 6	After a round of discussion, TL asked D3 for some specific information. D3 then asked V for clarification on aspects of the problem. D3 did some individual work on his screen for about four minutes, to locate some key information, then had a discussion with D5 and V for a further five minutes. During this time V sat down in a spare seat and continued some social banter with D5 and TL.
7, 8	SA answering a telephone query leant over the partition and asked a general question to the team 'does anyone know about problem x?'. D2 responded and asked TL specific questions. TL did some information searching.
9	D1 provided some further information to V. This was then discussed with V, D3 and D5.
10	TL gave some information to SA who passed on the information to the telephone caller.
11	The discussion between D3, D5 and V came to a close and TL asked for a summary of the response and made some notes in the problem record. V then leaves the team's area with some further social banter.

During this observed incident D4 contributed little to the discussion, except in general greetings, and worked on his own. D3 used headphones until Event 3 and replaced them after V left. D2 and D1 worked mainly on their own but provided key information when requested or when it was needed. The resolution of V's problem required input from most of the team members. Some of the input was very brief, others took more involved activity such as information searching. There were several themes to the discussion with V. This seemed to revolve around narrowing down the characteristics of the problem to particular areas. Once one avenue for the problem was eliminated then their attention turned to another.

Addressing the problem in the incident was quite involved. There was a lot of interaction between group members and there were several iterations in the discussion to narrow down aspects of the problem. The incident was similar to other incidents observed and can be characterised by small and frequent interactions between team members, sharing and soliciting information, a sense of common ownership of problems and a mode of socialising.

The team had a supportive environment and supportive communication structures. This included regular weekly meetings (which were mainly informal), daily telephone contact with workers in remote areas, and regular coffee breaks. Most of the meetings involved both socialising and work activity. Overall there was very much a 'can help' attitude. Overall, the communication structures seem appropriate to facilitate frequent interaction among group members. The observations coincide with the questionnaire responses, particularly in the aspect of group interaction and their approach to addressing problems and changes.

For this case study there is a strong social dimension to dealing with problems: It is very much a group activity. The communication structures and practice facilitate frequent interaction both on a social and work level. Indeed, the social interaction seems to support the frequent work interactions: within this team it is easy and quick to solicit needed information from a colleague to address a problem. This is consistent with the concept of *collective mind* (Weick and Roberts, 1993; Weick, 1993). The case study shows much 'heedful' interaction with good communication structures: "The collective mind that emerges during the interrelating of an activity system is more developed and more capable of intelligent action the more heedfully that interrelating is done." (Weick and Roberts, 1993,p.365) and "as heedful interaction and mindful comprehension increases, organisational errors decrease" (Weick and Roberts, 1993,p.357). In addition, the type of interaction with newcomers into the group is also an indicator of the level of collective mind: "The quality of collective mind is heavily dependent on the way insiders interact with newcomers" (Weick and Roberts, 1993,p.368). A 'good' example of a development project (as described by the senior manager) fits the concept of collective mind that provides elements of common problem framing, and heedful and mindful interaction in decision making.

7 Discussion, limitations and conclusion

Developing successful information systems is difficult. This is especially so for large and involved systems where there are likely to be demanding software engineering and technical challenges. Consequently, there are likely to be demanding challenges in identifying, defining and resolving requirements for a diverse set of users and stakeholders. However, the long-term survival and success of an information system are likely to depend on how well the system evolves to address the continual changes from the users and environment. Successful information systems have to evolve. This paper examined different approaches that tried to address these evolving and changing requirements. The approaches examined offer support in either understanding requirements, designing flexible systems or addressing some likely or known changes. However, the approaches examined seemed to fall short when dealing with unforeseen changes and uncertainties. The longer an information system is used, the more likely it will encounter such unforeseen changes and uncertainties. To understand how development teams address the unforeseen changes the paper has drawn upon several works on organisational structures and group interactions. These indicate that organisational structures have both formal and informal attributes. Furthermore, addressing unforeseen changes and associated problem solving is likely to require

interaction within the development team itself and with other stakeholders such as the users. The argument developed in this paper is that development teams will require suitable support structures to enable this interaction and that such structures are likely to involve formal and informal aspects.

An example of a good development team was used to examine such support structures. The case was 'good' in the sense that it was operating in a dynamic environment with changing requirements and it was also trying to address those changes. The responses of developers to the questionnaire indicate that they encountered many situations of uncertainty, problems and changes to requirements. Addressing these concerns often required input from other people either within their development team or from others outside the team. The observations confirmed the developers' responses. For the observed situations, addressing uncertainty and problem solving involved iterative processes where the focus changed as the team members learned more about the problem. Developers often required input from other people both within and outside their development team. The case study had fairly flexible communication structures, both formal and informal, that seemed to support quick and easy information sharing. Furthermore, the development team exhibited 'mindful interaction' as was observed during the study, and the informal (social) structure seemed to support that mindful interaction.

The case examined seems to support the argument developed in the paper, and the works on organisational structures and team processes, particularly on the aspect that development teams require suitable support structures to enable quick and easy interaction within themselves and with other stakeholders to address unforeseen changes. The structures are likely to involve social and formal elements.

However, there are limitations to this study. First, only one case has been investigated in depth so that we cannot be sure if this particular case is representative of other groups or if the findings apply to other groups of the same nature. Furthermore, the case study was based on observations, admittedly over a prolonged period, but observations only represent a glimpse of development activity and as such cannot be a very reliable measure of the true picture. There might well have been other incidents (which were not observed) where the development team did not address the problems or changes or where the interactions actually hindered problem solving. The case study itself was a 'good example' and it is unknown if other good examples have similar structures or indeed if there are 'bad examples' which share similar structures. Clearly, other in-depth case studies are needed to get a more robust view of the support structures.

The case study approach was chosen to examine real development practice and problem solving, and their corresponding support structures. To a large extent the study has achieved its purpose. If this case is typical of other good projects, with the support of both social and formal communicating structures, then an environment that supports informal meetings around a coffee table may add more to the success of a project than the choice of particular development methodologies, techniques or tools.

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Information Technology & People

Dangers inherent in the use of techniques: identifying framing influences

Carl Adams

Department of Information Systems, University of Portsmouth, Portsmouth, UK

David Avison

ESSEC Business School, SID, Cergy-Pontoise, France



Information Technology & People, Vol. 16 No. 2, 2003,
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Identifying
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influences

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Carl Adams

*Department of Information Systems, University of Portsmouth,
Portsmouth, UK, and*

David Avison

ESSEC Business School, SID, Cergy-Pontoise, France

Keywords *Information systems, Influence, Theory*

Abstract *The literature about the development of information systems tends to concentrate on methodologies, techniques and tools. There is significant published research about the potential negative aspects of using methodologies and tools (along with that discussing their potential benefits). Techniques, on the other hand, are seen largely as benign, very often as simple aids to help carry out a task, and are used in many methodologies. They might be seen as supporting the collection, collation, analysis, representation or communication of information about system requirements and attributes (or a combination of these). However, it is argued in this paper that techniques also have negative aspects and there are as many dangers in their use as in using methodologies and tools. In particular, techniques may restrict understanding by framing the ways of thinking about the problem situation. In other words, people's understanding of a problem can be profoundly influenced by how the problem is presented to them by the technique. Different development techniques can represent the same problem situation differently, and the way in which it is represented has considerable potential for influencing problem understanding and resultant decision making. Drawing on the cognitive psychology literature enables one to show how specific visual and linguistic characteristics of techniques may influence problem understanding. In addition, examining the taken-for-granted paradigm of a particular technique provides a further dimension influencing problem understanding. This knowledge of visual/language and paradigm attributes is applied to over 80 techniques used to a greater or lesser extent in IS development, indicating how different types of technique are likely to influence problem cognition. This serves two purposes. First, it exposes potential biases of a particular technique and makes users aware of the potential dangers. Second, the overall categorization may provide guidance to users in selecting appropriate techniques and combinations of techniques to help reduce any negative framing influences, provide a more holistic view of a problem situation and support a more appropriate problem-learning environment.*

Introduction

According to Avison and Fitzgerald (2003), there are three basic supports to information systems development:

- (1) methodologies;
- (2) techniques; and
- (3) tools.

The authors acknowledge the contributions of the two referees' which have greatly improved the paper.



Information Technology & People
Vol. 16 No. 2, 2003
pp. 203-234
© MCB UP Limited
0959-3845
DOI 10.1108/09593840310478694

Applying these attributes to different techniques gives an indication of how each is likely to influence problem cognition. This, in turn, will influence the way that particular applications are developed and what aspects of the problem situation are incorporated in any solution.

In this paper, we develop a classification that attempts to separate the objective and subjective characteristics of techniques. The classification may be used to provide guidance in selecting appropriate combinations of techniques to limit any negative framing influences and support an appropriate problem-learning environment. We propose this as only the beginning of a full classification of techniques. We hope that this will lead to the adoption of techniques, based on appropriateness to the problem situation, rather than because it just happens to be part of a methodology or the habits of the individual or organization.

The structure of the paper is as follows. First, there is a discussion on techniques, what they offer developers and an examination of their main characteristics. There follows an examination of how particular aspects of techniques may influence problem cognition. Specific works from the cognitive psychology literature are used which cover potential biases on cognition. These are then used to inform and develop a two-dimensional classification of techniques used in IS based on final presentation attributes and the underlying technique paradigm. Finally, some implications of these framing influences are discussed.

Techniques: potential benefits of their use and characteristics

Given that development techniques play such an influential role in how an information system is developed, it would be useful to consider what is gained through using development techniques. The use of a technique may offer one or more of the following advantages:

- reduces the solution of a problem to a manageable set of tasks;
- provides guidance on addressing the problem situation;
- adds structure and order to tasks;
- provides focus and direction to tasks;
- provides cognitive tools to address, describe and represent the problem situation;
- provides the basis for further analysis or work;
- provides a communication medium between interested parties;
- provides an output of the problem-solving activity; and
- provides support to the practitioner.

To give some specifics, techniques may be used to:

- help understand the problem situation (rich pictures);
- identify human activity systems (root definitions);
- analyze data aspects (normalization);

methodology or approach from another. For example, process-oriented methodologies emphasize dataflow diagrams, data-oriented ones emphasize entity-relationship diagramming and many people-oriented approaches emphasize stakeholder analysis. These are very different techniques, aimed at emphasizing particular aspects of the problem situation, which methodology authors have deemed important. New technologies and applications might give rise to new techniques and new tools to support development. Thus, Proctor (1995) suggests computer-produced mind-maps, rich pictures and charts as aids to creativity. Techniques may be similar. Structured English and pseudo-code, for example, are similar ways of representing process logic, though the latter is nearer machine language and the former nearer natural language. Indeed, a range of techniques might be used for a particular stage of information systems development. Some techniques are called by different names depending on the methodology. Thus, entity life histories or entity life cycles are different names for the same basic technique. To make the situation even more confusing, different methodologies use different representational symbols for the same technique. There are several variants of dataflow diagrams. A process in a dataflow diagram, for example, is sometimes represented as a circle and at other times by a rectangle. These confusions may cause minor problems when using techniques, but this paper is addressing much more fundamental dangers, and we draw on the psychology literature to highlight these.

Techniques impact on problem understanding: lessons from cognitive psychology

Potential blocks to problem cognition

From creative, innovative and lateral thinking perspectives, Groth and Peters (1999) examined potential barriers to creative problem solving among managers due to the use of techniques. They identified a long list of perceived barriers to creativity including fear of failure, lack of confidence, environmental factors, fear of success and its consequences, fear of challenge, routines, habits, paradigms, pre-conceived notions, rules, standards, tunnel sight, internal barriers, structure, socialization, external barriers, money, rebellion, health and energy, mood, attitudes, desire and time (Groth and Peters, 1999, p. 183). They grouped the perceived barriers into "self-imposed", "professional environment" and "environmentally imposed". Fear of some sort seems to be the predominant barrier, at least for these managers.

Adams (1987), in his book *Conceptual Blockbusting*, draws heavily from the psychology literature to identify four main areas of conceptual blocks:

(1) *Perceptual blocks:*

- seeing what you expect to see – stereotyping;
- difficulty in isolating the problem;
- tendency to delimit the problem area too closely (i.e. imposing too many constraints on the problem);

problem solving has fostered numerous attempts to improve creative problem solving by helping people represent problems in useful ways (Mayer, 1996, p. 68).

The key element here is that the way in which a problem is represented will affect the understanding of the problem. Relating this to techniques, we can deduce that the visual, linguistic and other representation imposed by a technique will impact problem cognition.

The Gestalt movement in cognitive psychology has had a big impact on our understanding of problem solving. The movement has led to various strands of techniques, such as lateral thinking and other creative techniques. Gillam (1992) gives a more current examination of Gestalt theorists, particularly in the area of perceptual grouping (i.e. how people understand and groups). Gillam (1992) shows that perceptual coherence (i.e. grouping) is not the outcome of a single process (as originally proposed by Gestalt theory) but may be best regarded as a domain of perception (i.e. the grouping process is likely to be more complex, being influenced by context and other aspects) (Gillam, 1992, p. 161).

The Gestalt psychologists indicate a potentially strong influence on problem understanding, that of functional fixedness: "prior experience can have negative effects in certain new problem-solving situations . . . the reproductive application of past habits inhibits problem solving" (Mayer, 1996). The implication is that habits "learned" using previous techniques and problems would bias the application of new techniques and problems. This could explain the dominance of certain techniques used in IS development, such as dataflow diagrams and entity-relationship models. It may also explain why so many "new" techniques are rehashes of older ones. It might also explain why "newer" techniques take so long to get established.

Normative and paradigm influences. The cognitive psychology literature suggests that there will be a different weight attached to the results of a normative as opposed to a descriptive type of technique. The basis for this is the "understanding/acceptance principle" (Slovic and Tversky, 1974), which states that "the deeper the understanding of a normative principle, the greater the tendency to respond in accordance with it" (Stanovich and West, 1999, p. 349). Further, some studies indicate there is a tendency to move towards normative reasoning as opposed to non-normative reasoning to describe problems, particularly so when the initial problem is represented using predominantly normative attributes. However, in other studies when a problem is presented using both normative and non-normative argument there was no significant tendency to move towards normative descriptions (Stanovich and West, 1999, p. 374). Relating this to development techniques, there are two items of interest. First, the deeper the understanding of a technique (for example, by previous experience or training), then the more likely it will be that the findings will be accepted. Second, there will be a tendency to move towards the use and acceptance of the findings from techniques based more on normative than on descriptive models. This is particularly so if starting from a

Constantine (1979)), we might conclude from category inclusion that a task in an accounting department will always be different from a task in a personnel department, which clearly may not be the case as both departments will have some similar tasks, such as ordering stationery.

However, this category inclusion is not universally the case. Sloman (1998) found that the process is likely to be more complex. In his study, participants frequently did not apply the category inclusion principle:

Instead, judgments tended to be proportional to the similarity between premise and conclusion ... arbitrary hierarchies can always be constructed to suit a particular purpose. But those hierarchies are apparently less central to human inference than logic suggests (Sloman, 1998, p. 31).

The initial premise surrounding a situation is likely to be related to the underlying paradigm. Dictating a hierarchical structure in itself may not result in category inclusion biases; however, coupled with an underlying paradigm of closed hierarchical properties it will more likely result in category inclusion biases. Along the same theme are proximity influences and biases. The understanding of items can be influenced by the characteristics of other items in close proximity.

Discourse influences. The discourse and language used to describe a problem are likely to play a role in problem understanding. Adams (1987) discusses various different types of "languages of thought" used in problem representing and solving. People can view problems using mathematical symbols and notation, drawings, charts, pictures and a variety of natural verbal language constructs such as analogies and scenarios. Further, people switch consciously and unconsciously between different modes of thought using the different languages of thought (Adams, 1987, p. 72). The information systems development environment is awash with technical jargon and language constructs. In addition, different application areas have their own set of jargon and specific language. Individual techniques have their own peculiar discourse consisting of particular language, jargon and taken-for-granted constructs, all of which may exert influence. For instance, the initial discourse used affects understanding of a problem situation, particularly in resolving ambiguities (Martin *et al.*, 1999). Resolving ambiguous requirements is a common task in information systems development (Gabbay and Hunter, 1991). The initial discourse sets the context with which to consider the situation. A technique will usually dictate some elements of initial discourse and subsequent processes with their own discourse, effectively leading questions and processes: "The strength of context variable is critical and should receive more focus in language comprehension research, especially in the areas of ambiguity research" (Gabbay and Hunter, 1991, p. 835).

Perceptual processing is profoundly influenced by the sequence of information provided and the relational constructs of information (Mulligan, 1999). The sequence and number of items in a list will influence how people will understand (and recall) the items and how people will categorize them. The implications of

Goal influences. Goal or aim aspects also profoundly influence problem understanding by providing direction and focus for knowledge compilation (Anderson, 1987). Goals influence the strategies people undertake to acquire information and solve problems. Further, when there is a lack of clear goals, people are likely to take support from a particular learning strategy, which will typically be prescribed by the technique:

The role of general methods in learning varies with both the specificity of the problem solver's goal and the systematicity of the strategies used for testing hypothesis about rules. In the absence of a specific goal people are more likely to use a rule-induced learning strategy, whereas provision of a specific goal fosters use of difference reduction, which tends to be a non-rule-induction strategy (Vollmeyer *et al.*, 1996).

The implications are that techniques with clear task goals will impact the focus and form of information collection (for example, what information is required and where from, along with what information is not deemed relevant) and how the information is to be processed. Further, if there are no clear goals, then people are likely to rely more heavily on the learning method prescribed by the technique.

Summary of framing influences. The framing influences discussed above indicate that any framing effect due to the characteristics of a technique is likely to be complex and interwoven. However, some main themes emerge. The visual, structure and linguistic aspects are related and might be combined in a general "representational" heading. Equally, several aspects can be classed collectively as "paradigm/process" influences. Arguably, the more prescribed and structured a technique is, then the more likely that "predictable" framing influences can be ascribed. Overall, the works from the cognitive psychology field give several indications about how the characteristics of a technique are able to exert influence on problem cognition.

Applying lessons from cognitive psychology: a macro analysis of techniques

As the previous discussion shows, the literature from cognition psychology indicates two main types of influences: representational influences (for example, prescribing certain visual and other "language" representations) and paradigm/process influences (for example, underlying approach, prescribed processes and tasks utilizing specific language).

The "visual and language" characteristics imposed by techniques are likely to be explicit, in that specific representations will be prescribed, such as distinct diagrams, tables and other visual outputs in the final representation. The process characteristics may also be explicit (for example, list and order of tasks to be completed).

The underlying paradigms for techniques are likely to be far less explicit. However, there is likely to be some relationship between paradigm and process since an underlying paradigm is likely to dictate the processes and activities to be undertaken. As such, a classification by representational influences and

whereas Farbey *et al.* (1994) argue that these same techniques are qualitative. As Jantsch (1967, p. 113) relates; "there is no clear boundary line (between qualitative and quantitative techniques) in many cases, and the same technique can take either approach".

Another approach to categorise the paradigm/process elements of techniques is to consider how innovative or creative they are. Couger *et al.* (1993, p. 380) give such a perspective and use a continuum from "analytically dominant" to "intuitively dominant". Analytically-oriented techniques use a structure to generate a logical, linear pattern of thought and steps. Intuitive-oriented techniques tend to skip steps and be far less linear, arriving at solutions by leaps. Similarities can be found here with de Bono's "vertical" and "lateral" thinking classification of techniques (de Bono, 1977). As with the qualitative/quantitative categories discussed above, this grouping is open to considerable interpretation on where a technique would fit on the continuum. A variation to this approach has been suggested by McFadzean (1998), who used a creativity continuum based on three categories:

- (1) paradigm-preserving techniques;
- (2) paradigm-stretching techniques; and
- (3) paradigm-breaking techniques.

Again, placing techniques on this creativity continuum is likely to be subjective; for example, McFadzean (1998) classifies the brainstorming technique as "paradigm-preserving", whereas we would argue that a better interpretation might be to class it as "paradigm-stretching".

A further approach to categorisation, by explorative/normative characteristics, has been proposed by Gabor (1968) and Jantsch (1967). In this context, exploratory techniques start by assessing the present situation and moves towards the future. Normative techniques start by assessing future goals, aims and desires, then working back towards the present situation. However, as with the qualitative/quantitative categories discussed above, several techniques can be grouped in both categories (for example, Jantsch, 1967).

There are similarities with each of these classifications. They seem to have fairly "closed" techniques at one end of a continuum and fairly "open" techniques at the other. Of course, placing techniques on this closed/open continuum is likely to be subjective (as with the previous classifications), but attempting to do this may provide a useful perspective:

- (1) *Closed paradigm/process:*
 - stays within defined scope;
 - closed set of rules and language;
 - prescriptive processes and tasks;
 - prescriptive representations; and
 - mostly objective.

Closed paradigm	Open paradigm	Identifying framing influences
Five whys Five Ws and the H Force field analysis Future analysis Hazard and operability studies (HAZOP) Hazards analysis and critical control points (HACCP) "Johari" window of knowledge McKinsey 7 S framework Maintainability analysis Markov chains, Markov analysis Matrix techniques Morphological approaches Normalisation Options matrix Planning assistance through technical evaluation of relevance numbers (PATTERN) Precedence diagramming method (PDM) network Preliminary hazard analysis (PHA) Program evaluation and review technique (PERT) Rapid ranking Relevance trees, reliance trees Reliability networks Requirements, needs and priorities (RNP) Risk assessment (RA)/engineering (RE)/management Robustness analysis Shareholder value analysis (SVA) Stakeholder analysis Strategic choice Strategic options development and analysis (SODA) Structured English Structured walkthroughs Synergistic contingency evaluation and review technique (SCERT) Tree analysis Value chain/engineering analysis		219

Table I.

Works from the cognitive psychology literature indicate how these characteristics are likely to affect problem understanding. In prospect theory, this is known as the framing effect. Techniques may provide barriers to problem cognition rather than enlighten, and visual and linguistic influences may blinker perception in one direction.

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Appendix. Table of techniques to deal with uncertainty in IS development
This Appendix classification is informed with works from cognitive psychology and provides information on likely influences on problem cognition. It has two dimensions, one covering representational attributes and the other covering paradigm/process attributes. The classification has been applied to a range of techniques, which are represented in Table AI.

Technique	Description	References	Classification
Action diagrams	Represents process logic using limited subset of natural language to specify sequence of actions (similar to structured English)	Martin (1989)	Hierarchy structure Closed Prescriptive
Affinity diagram	This is a brainstorming technique aimed at aiding idea generation and grouping. It seems to be particularly good at identifying commonalities in thinking within the group. Relies heavily on using a facilitator to run the session	Bicheno (1994, p. 39); Mizuno (1988)	Non-hierarchy structure Open Non-prescriptive
Analytic hierarchy process	Saaty's AHP uses a (three-level) hierarchy to represent relationships. Used in analysis of spare parts for manufacturers	Gajpal <i>et al</i> (1994)	Hierarchy structure Closed Prescriptive
Association/images technique	Tries to link and find associations between processes (and items)	Couger <i>et al</i> (1993, p. 385)	Non-hierarchy structure Closed Non-prescriptive
Attribute association	Works from the premise that all ideas originate from previous ideas (i.e. they are modified ideas), based on lists of characteristics or attributes of a problem or product. Each characteristic is changed and the result discussed. A cross between brainstorming and matrix	Couger <i>et al</i> (1993, p. 394)	Matrix structure Open Prescriptive

(continued)

Table AI.

Technique	Description	References	Classification
Critical success factors (CSF)	Looks at the critical factors which will influence the success of an IS or, from a strategic view, all the organization's IS. It is a matrix-type technique with the characteristics of the technique down one axis and the factors on the other axis	e.g. Flynn (1992); Pinto and Slevin (1987)	Matrix structure Closed Prescriptive
Cross-impact matrices	See matrix techniques	Waddington (1977, p. 202)	Matrix structure Closed Prescriptive
Dataflow diagram	Structural representation showing relationship between processes and data	Avison and Fitzgerald (2003)	Hierarchy structure Closed Prescriptive
Decision matrices	See matrix techniques	e.g. Jantsch (1967, p. 206)	Matrix structure Closed Prescriptive
Decision trees	See tree techniques	e.g. Andrew and Moss (1993, p. 144)	Hierarchy structure Closed Prescriptive
Decomposable matrices	The components of each subsystem are listed and arranged within a matrix and the interactions between elements are weighted. We can then focus on relationships between components (a cross between matrix and relationship)	Couger <i>et al</i> (1993, App.)	Hierarchy structure Matrix structure Closed Prescriptive
Delphi	Aims to get a consensus view or long-term forecast from a group of experts by iteratively polling them. Developed by Helmer and Dalkey at the RAND Corporation in the 1960s	e.g. Carley (1980, p. 148); Waddington (1977)	Structure-free Closed Non-prescriptive
Dimensional analysis	Aims to explore and clarify the dimensions and limits of a problem situation. It examines five elements of a problem: substantive, spacial, temporal, qualitative, and quantitative dimensions	Couger <i>et al</i> (1993, App.)	Matrix structure Non-hierarchy structure Closed Non-prescriptive
Entity life histories (cycles)	Shows the changes in state of an entity over time	Avison and Fitzgerald (2003)	Non-hierarchy structure Closed Prescriptive

(continued)

Table AI.

Technique	Description	References	Classification	Identifying framing influences
Future analysis	A technique specifically aimed at IS development, it examines possible future scenarios in which an IS would have to operate	Land (1982, p. 203)	Matrix structure Closed Open Prescriptive	229
Gaming, game theory	Several gaming techniques to deal with competitive or conflict situation (see also Metagames and Hypergames)	e.g. Jantsch (1967, p. 237)	Non-hierarchy structure Closed Non-prescriptive	
Hazard and operability studies (HAZOP)	A systematic technique to assess the potential hazards of a project, system or process. Usually associated with the chemical industry	e.g. Andrew and Moss (1993, p. 52)	Hierarchy structure Matrix structure Closed Prescriptive	
Hazards analysis and critical control points (HACCP)	Identifies critical points in the work processing which need controls or special attention. Usually associated with production, particularly food production	Camden (1987)	Matrix structure Closed Prescriptive	
Hypergames	A variation on game theory, which develops a "game" from the perspectives of the different stakeholders	Bennet <i>et al</i> (1992, p. 283)	Non-hierarchy structure Closed Non-prescriptive	
Influence diagrams, inter-relationship diagrams	Similar to cognitive mapping, it generates logical relationships between events or activities	e.g. Bicheno (1994, p. 39)	Non-hierarchy structure Closed Non-prescriptive	
"Johari" window of knowledge	The technique named after inventors (Joe Luff and Harry Ingham), tries to identify areas of understanding and lack of understanding	e.g. Obolensky (1995, p. 290)	Matrix structure Non-hierarchy structure Closed Non-prescriptive	
Lateral thinking techniques	Several techniques including: the generation of alternatives, challenging assumptions, suspended judgment, dominant ideas and crucial factors, fractionation, the reversal method, brainstorming, analogies and random stimulation. Arguably these types of techniques would be suited to early analysis and problem identification. Equally, some of the techniques could be used in the later stages of systems development. For instance, fractionation and challenging	De Bono (1969, 1970, 1977)	Matrix structure Non-hierarchy structure Structure-free Open Non-prescriptive	
(continued)				Table AI.

Technique	Description	References	Classification	Identifying framing influences
Normalisation	The application of rules to entities to support efficient storage and access of data	Date (2000)	Hierarchy structure Closed Prescriptive	231
Opposition-support map	A representation of opposition and support for particular actions	e.g. Obolensky (1995, p. 273)	Non-hierarchy structure Closed Non-prescriptive	
Options matrix	See matrix techniques	e.g. Obolensky (1995, p. 250)	Matrix structure Closed Prescriptive	
Planning assistance through technical evaluation of relevance numbers (PATTERN)	Developed by Honeywell, it is the first large-scale application of relevance trees to numerical analysis, and makes use of computing support	e.g. Jantsch (1967, p. 219)	Hierarchy structure Closed Prescriptive	
Precedence diagramming method (PDM) network	Similar to PERT, but has four relationships (FS finish-start, SS start-start, FF finish-finish, SF start-finish)	Obolensky (1995, p. 308)	Hierarchy structure Closed Prescriptive	
Preliminary hazard analysis (PHA)	Similar to risk assessment	e.g. Andrew and Moss (1993, p. 60)	Hierarchy structure Matrix structure Closed Prescriptive	
Program evaluation and review technique (PERT)	A networking technique similar to critical path analysis, but addresses uncertainty in calculating the task times	e.g. Jantsch (1967, p. 233)	Hierarchy structure Non-hierarchy structure Closed Non-prescriptive	
Rapid ranking	Technique aims to list and rank the important issues related to a problem	e.g. Andrew and Moss (1993, p. 58)	Matrix structure Closed Prescriptive	
Rational bargaining overlaps (RBO)	Technique used in negotiating situations	e.g. Obolensky (1995, p. 297)	Structure-free Closed Non-prescriptive	
Relevance trees, reliance trees	Relevance trees (or reliance trees), sometimes referred to as hierarchical models or systems, first proposed by Churchman <i>et al.</i> (1957).	e.g. Jantsch (1967, p. 219)	Hierarchy structure Closed Prescriptive	
(continued)				Table AI.

Technique	Description	References	Classification	Identifying framing influences
Simulation	The features and workings of a complex situation are simulated. The model can then be changed (either the inputs or workings of the model) to observe what will happen. Good for developing a deeper understanding of the problem area	e.g. Carley (1980, p. 129); Andrew and Moss (1993, p. 244)	Non-hierarchy structure Closed Non-prescriptive	
Soft systems methodology (SSM)	Aimed at problem identification and representing views of different stakeholder perspectives – a theme common in many of the subjective/qualitative techniques (see also rich pictures)	Checkland (1981)	Non-hierarchy structure Structure-free Open Prescriptive	233
Stakeholder analysis	Tries to understand the needs of the key stakeholders and how those needs are currently being met. It is effectively a range of techniques used for different stakeholder groups, e.g. use VCA for analyzing supplier stakeholder group and SVA for analyzing the shareholder/ stakeholders	e.g. Obolensky (1995, p. 40)	Matrix structure Non-hierarchy structure Closed Non-prescriptive	
Strategic choice	Aims to deal with the interconnections of decisions and problems. Focuses attention on alternative ways of managing uncertainty	Friend and Hickling (1997, p. 121); also in Rosenhead (1992)	Hierarchy structure Matrix structure Closed Prescriptive	
Strategic options development and analysis (SODA)	Though it has a “strategic” title, it is aimed at getting consensus actions in messy situations	Eden (1992)	Hierarchy structure Closed Prescriptive	
Structure diagrams	Exemplify structured decomposition of processes	Jackson (1983)	Hierarchy structure Closed Prescriptive	
Structured English (similar to pseudo-code)	Expresses logic of process using narrative	Avison and Fitzgerald (2003)	Hierarchy structure Closed Prescriptive	

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information ideas insight

Technique	Description	References	Classification
Suggested integration of problem elements (SIL)	A brainstorming technique, gets participants to write down ideas, then pairs of ideas are compared to integrate and interrogate the ideas	Couger <i>et al</i> (1993, App.)	Structure-free Open Non-prescriptive
SWOT analysis (strengths, weaknesses, opportunities and threats)	Generates perceptions of how customers (or others) view the organization (or problem situation)	e.g. Obolensky (1995, p. 252)	Matrix structure Open Prescriptive
Synergistic contingency evaluation and review technique (SCERT)	Risk assessment technique used in oil-processing installations, power plants and large engineering projects.	Chapman (1984)	Hierarchy structure Matrix structure Closed Prescriptive
Systems failure method (SFM)	Looks at three levels of influence: organization, team, and individual. Examines potential failure from these three levels	Fortune and Peters (1995)	Non-hierarchy structure Open Non-prescriptive
Tree analysis	See decision trees	e.g. Andrew and Moss (1993, p. 144)	Hierarchy structure Closed Prescriptive
Value chain/ engineering analysis	Analyses the supply chain within an organization and tries to identify (and quantify) when extra "value" is added to a product or service	e.g. Obolensky (1995, p. 259)	Hierarchy structure Closed Prescriptive
Wildest idea	Tries to get people to come up with a wild idea to address a problem. With this as a starting-point the group continue to generate ideas	Couger <i>et al</i> (1993, App.)	Structure-free Open Non-prescriptive

Table AI.

Technique	Description	References	Classification
Reliability networks	These are representations of the reliability dependencies between components of a system. Similar to CPA/PERT-type networks, but represent "dependencies" rather than order of events. Once the networks are drawn, then estimates for failure rates of each component can be evaluated. Similar to relevance/reliance trees	e.g. Andrew and Moss (1993, p. 214)	Hierarchy structure Matrix structure Closed Prescriptive
Requirements, needs and priorities (RNP)	Based on lists and matrices, aims to understand the impact of an application on the organization prior to development. Top management plays a key role	Batiste and Jung (1984)	Matrix structure Closed Prescriptive
Rich pictures	Attempts to encapsulate all aspects of a problem situation in a diagram including people, problems, conflicts, influences, information flows, etc.	e.g. Checkland and Scholes (1990); Avison and Wood-Harper (1995)	Non-hierarchy structure Open Non-prescriptive
Risk assessment/engineering/management	Attempts to identify and, where possible, quantify the risks in a project. Usually associated with large-scale engineering projects but principles can be appropriate to smaller-scale situations	e.g. Grey (1995); Andrew and Moss (1993); Chapman (1984, 1990); Beard (1969); Bohlmann (1909)	Hierarchy structure Matrix structure Closed Prescriptive
Robustness analysis	The aim is to "keep the options open". It does this by identifying and analysing a range of scenarios and checking that actions are most "robust" in those scenarios.	Rosenhead (1992, p. 193); Rosenhead and Mingers (2001)	Non-hierarchy structure Open Non-prescriptive
Root definitions	Aimed at representing views of different stakeholder perspectives	Checkland (1981)	Non-hierarchy structure Structure-free Open Non-prescriptive
Scenario planning/writing/analysis	Scenario planning gets participants to consider different possible futures for a particular area of interest	e.g. Carley (1980, p. 148)	Structure-free Open Non-prescriptive
Shareholder value analysis (SVA)	Tries to identify the key values and needs of the shareholders and how those needs are currently being met	e.g. Obolensky (1995, pp. 47, 282)	Matrix structure Non-hierarchy structure Closed Non-prescriptive (continued)

Technique	Description	References	Classification
	assumptions could be used in a design situation. Many of these lateral thinking techniques have been modified and combined to make "new" techniques		
Maintainability analysis	Examines the component parts of a system and analyses them, in probability terms, for ease of maintenance. Usually associated with engineering product design	e.g. Andrew and Moss (1993, p. 218)	Hierarchy structure Closed Prescriptive
Markov chains, Markov analysis	Uses probability to model different states within a system	e.g. Andrew and Moss (1993, p. 229)	Non-hierarchy structure Closed Non-prescriptive
Matrix techniques, matrix analysis	There are several "matrix" techniques, that aim to represent and compare requirements or features in a matrix format. Some techniques add a weighting or ranking of the requirements or features	e.g. Jantsch (1967, p. 206); Bicheno (1994, p. 43); Geschka (1996)	Matrix structure Closed Prescriptive
McKinsey 7 S framework	A diagnostic tool to identify the interactions within an organisation	e.g. Obolensky (1995, p. 272)	Matrix structure Closed Prescriptive
Metagames	A variation of game theory, which attempts to analyze the processes of cooperation and conflict between different "actors"	Howard (1992, p. 239)	Non-hierarchy structure Closed Non-prescriptive
Morphological approaches	This takes a systematic approach to examining solutions to a problem. It does this by identifying the important problem characteristics and looks at the solutions for each of those characteristics. First developed by Zwicky, a Swiss astronomer, in 1942	e.g. Jantsch (1967, p. 175); Couger <i>et al.</i> (1993, App.); Geschka (1996)	Matrix structure Non-hierarchy structure Closed Non-prescriptive
Network techniques	There are several diagramming techniques, which can be classed as network techniques. Some, like CPM and PERT, are quantitative. Others, like interrelationship diagrams, rely more on subjective logical relationships or connections	e.g. Jantsch (1967, p. 75); Lucy (1992, p. 313)	Hierarchy structure Non-hierarchy structure Closed Non-prescriptive
Nominal group technique (NGT)	Similar to brainstorming	Couger <i>et al.</i> (1993, App.)	Non-hierarchy structure Open Non-prescriptive (continued)

able AI.

Technique	Description	References	Classification
Entity-relationship models	Analyses data relationships into entities, attributes and relationships	Date (2000)	Non-hierarchy structure Closed Prescriptive
External dependencies	A summary list of external items that affect the project. These "need not be planned or detailed. However, they do need to be summarized to remind the project team that there are activities outside the project of which they need to be aware" Oblensky (1995, p. 313)	Oblensky (1995, p. 313)	Matrix structure Closed Prescriptive
Fagan reviews	Getting a group of peers to critically review an analysis, design or code module	Fagan (1976)	Structure-free Closed Non-prescriptive
Failure modes and effect analysis (FMEA)	Examines the various ways a product, or system, can fail and analyze what the effect of each failure mode would be	e.g. Bicheno (1994, p. 65); Andrew and Moss (1993, p. 66); Fortune and Peters (1995)	Hierarchy structure Matrix structure Closed Prescriptive
Fault tree analysis	A tree approach to relating potential fault causes	Vesely (1970); Andrew and Moss (1993, p. 144)	Hierarchy structure Closed Prescriptive
Five "Cs" and "Ps"	Check-lists of things to consider. (The Cs are context, customers, company, competition and costs; the Ps are product, place, price, promotion, people)	e.g. Obolensky (1995, p. 252)	Matrix structure Closed Prescriptive
Five whys	Invented by Toyota, it is about developing a questioning attitude, to probe behind the initial given answers. There is also a "five hows" along the same principles. These are very similar to the earlier lateral thinking "challenging assumptions" and the examine stage of a methodology study	Bicheno (1994, p. 58)	Matrix structure Closed Prescriptive
Five Ws and the H	Who-what-where-when-why and how. Brainstorming techniques answer these questions	Couger <i>et al</i> (1993, p. 382)	Matrix structure Closed Open Prescriptive
Force field analysis	Idea generation and list technique to identify "forces" pulling or pushing towards an ideal situation	Couger <i>et al</i> (1993, p. 383)	Matrix structure Closed Open Prescriptive

Table AI.

(continued)

Technique	Description	References	Classification
Boundary examination	Defining and stating assumptions about problem boundary	Couger <i>et al</i> (1993)	Non-hierarchy structure Open Non-prescriptive
Brainstorming	Aimed at idea generation. See also lateral thinking	De Bono (1977); Clark (1958); Waddington (1977)	Structure-free Open Non-prescriptive
Brainwriting – shared enhancements variation	Similar to brainstorming, but gets participants to record ideas themselves	Couger <i>et al</i> (1993, App.); Geschka (1996)	Structure-free Open Non-prescriptive
Bug list	Gets participants to list items that “bug” them about the system. Aims to get a consensus on what the problem areas are	Couger <i>et al</i> (1993, App.)	Matrix structure Closed Prescriptive
Case-based reasoning	Uses experience in previous cases to inform present problem situation	Watson (1997)	Structure-free Open Prescriptive
Class diagrams (object orientation)	Sees objects represented as an instance of some class in a hierarchy of classes	Booch (1991)	Hierarchy structure Closed Prescriptive
CoCoMo	Project estimation techniques using mathematical formula	Cadie and Yeates (2001)	Non-hierarchy structure Closed Prescriptive
Cognitive mapping	Develops a model of inter-relationships between different features	Eden (1992)	Non-hierarchy structure Open Non-prescriptive
Common cause failures (CCFs)	More an engineering tool to identify common causes for possible failures	e.g. Andrew and Moss (1993, p. 201)	Matrix structure Closed Prescriptive
Conceptual models (Checkland)	Shows relationship between activities	Avison and Wood-Harper (1990); Checkland and Scholes (1990)	Non-hierarchy structure Closed Non-prescriptive
Critical path analysis (CPA), critical path method (CPM)	See network techniques	e.g. Jantsch (1967, p. 233)	Non-hierarchy structure Closed Non-prescriptive (continued)

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By classifying the characteristics of techniques, this paper has tried to indicate how different types of technique are likely to influence problem cognition, and in doing so has tried to map the framing effect of techniques. In truth, the discussion of these framing effects has shown that they are complex and interwoven. However, there are two continua that are striking. These are the degree of openness of the approach and the degree to which the technique is rule-based. Our major classification places techniques, therefore, into one of four quadrants:

- (1) prescriptive/closed;
- (2) prescriptive/open;
- (3) non-prescriptive/closed; and
- (4) non-prescriptive/open.

It should be a concern to information systems developers that, in our classification of over 80 techniques (see Appendix), over three-quarters are found in the closed rather than the open paradigm, suggesting that the vast majority of techniques used in systems work have limited vision. Further, the majority are also prescriptive, limiting perception by restricting the user to a set of rules that should not be transgressed. When they are supported by tools, these rules may be enforced on their users. Even when no tools are in use, these rules are likely to be enforced as "standards" and transgressing them seen as not acceptable.

Readers may well disagree with our premise that complex and interwoven characteristics of techniques can be reduced into a few characteristics listed in the Appendix. Further, readers may disagree about our placement of techniques in the classification, and we have certainly not included all techniques used in information systems development. However, we expect that modification and enlargement of our classification will not change this basic result shown in Table I.

As a result of this observation, information systems developers may well decide to include, in their array of techniques used to address problem situations, those that are open as well as closed, and non-prescriptive as well as prescriptive. They may also ensure that they include techniques which are of a free structure, as well as those of more formal structures, such as matrices and hierarchies. Using such an array of techniques will help to reduce the possibilities of bias due to the type of technique used.

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	Closed paradigm	Open paradigm
Non-prescriptive structure	Association/images technique Cognitive mapping Critical path analysis/method (CPA/CPM) Delphi Dimensional analysis Entity-relationship models Fagan reviews Gaming, game theory Hypergames Influence diagrams, interrelationship diagrams "Johari" window of knowledge Markov chains, Markov analysis Metagames Morphological approaches Network techniques Opposition-support map Program evaluation and review technique (PERT) RBO – rational bargaining overlaps Robustness analysis Scenario writing/analysis Shareholder value analysis (SVA) Simulation Stakeholder analysis Systems failure method (SFM)	Affinity diagram Boundary examination Brainstorming Brainwriting – shared enhancements variation Cognitive mapping Hypergames Lateral thinking techniques Nominal group technique (NGT) Rich pictures Root definitions Scenario planning SIL – suggested integration of problem elements Systems failure method (SFM) Wildest idea
Prescriptive structure	Action diagrams Analytic hierarchy process Bug list Class diagrams CoCoMo Common cause failures (CCFs) Conceptual models Critical success factors (CSFs) Cross-impact matrices Dataflow diagram Decision matrices Decision trees Decomposable matrices Dimensional analysis Entity life histories (cycles) External dependencies Failure modes and effect analysis (FMEA) Fault tree analysis Five "Cs" and "Ps"	Attribute association Case-based reasoning Five whys Five Ws and the H Force field analysis Future analysis Lateral thinking techniques Risk assessment (RA)/engineering (RE)/management SWOT analysis (strengths, weaknesses, opportunities and threats)

Table I.
IS techniques
grouped into
structure and
paradigm

(continued)

- (2) *Open paradigm/process:*
- open, less defined scope;
 - more open set of rules and language;
 - less prescriptive processes and tasks;
 - less prescriptive representations; and
 - mostly subjective.

A two-dimensional classification: visual/language and paradigm/process influences

There are likely to be some correlations between the “visual/language representation” and the “paradigm/process representation”. For instance, techniques that impose strong hierarchical structures are likely to have “closed” dispositions (for example, more formal and structured, restrictive scope, more objective paradigm). Grouping according to visual/language and paradigm/process attributes can be represented two-dimensionally, as in Figure 1.

Looking at Figure 1, the closer to “A”, the more closed and “objective” a technique will be. It is likely to have the following cognitive influences:

- reduced, but defined problem/solution spaces;
- more “social defence” attributes providing cognitive and emotional support, but also more “rituals” of technique, distracting attention from the actual “problem situation”;
- more functional fixedness and category inclusion biases (or, similarly, item ordering and relational/proximity biases);
- more normative representation and, correspondingly, more acceptance of results;
- more detailed description of items, resulting in increased perception of likelihood of items; and
- more defined goals, resulting in more rule-induced learning activity.

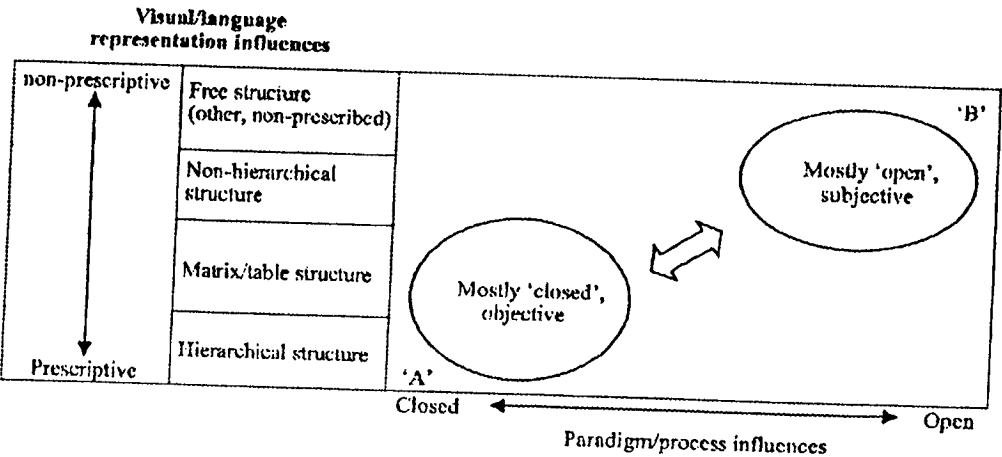


figure 1.
rouping of techniques
/ visual/linguistic and
radigm characteristics

paradigm/process influences might provide a reasonably objective metric with which to view influences on cognition.

Representational influences

Focusing on the representational influences, the initial grouping can be informed by the cognitive psychology literature discussed above. The final representation of techniques, consisting mainly of visual characteristics and some language constructs, falls into three distinct categories: a matrix/table structure, a hierarchical structure, and a non-hierarchical structure. In addition, there is a fourth category which accounts for techniques that do not prescribe a particular presentation. This could be called structure-free. The characteristics of each are detailed below:

- (1) *Matrix/table structure*: lists, tables or matrix format; and
- (2) *Hierarchical structure*:
 - functional breakdowns; and
 - visual representations similar to a hierarchical organization chart.
- (3) *Hierarchy-free structure*:
 - clear relationships;
 - network structures; and
 - non-hierarchical structures.
- (4) *Structure-free (other, non-prescribed)*:
 - non-prescribed structures;
 - non diagrammatical structures (for example, verbal, written structures); and
 - other, freer structures.

Paradigm/process influences

Focusing on the paradigm and process influences, the initial grouping can also be informed with the cognitive psychology literature discussed above. Examining different categories for the underlying paradigm and processes of techniques, one could group by the qualitative/quantitative (or by subjective/objective, judgmental/rational) characteristics (for example, Wright and Ayton (1987)). Objective techniques, that is, those relying on "hard" data, use rigid scientific or mathematical "rules". They are aimed at situations where following these rules is appropriate. Subjective techniques are those that rely more on judgment and interpretation of complex situations. However, few decisions (if any) are made completely on quantitative or qualitative information (for example, Wright and Ayton, 1987; Powell, 1992), but techniques could be classed on some form of qualitative/quantitative scale. However, deciding which is the predominant characteristic is itself subjective: Powell (1992) describes some techniques for evaluation as quantitative,

this are that the language and sequence of describing a problem situation, the questions asked and how they are asked and the implied relationships (all of which are usually prescribed by a technique) will bias problem understanding, for example, by forcing "leading questions" or "leading processes".

Language aspects highlight another set of possible influences, those of communication between different groups of people (for example, such as that between analysts and users). Differences of perspective between different groups of people in the development process have been discussed within the IS field under the heading of the "softer" aspects or as the organizational or people issues (for example, Checkland, 1981; Sauer, 1993; Lederer and Nath, 1991). Identifying differences and inconsistencies can be classed as a useful task identifying and dealing with requirements (Gabbay and Hunter, 1991). From cognitive psychology, there are also other considerations. Teigen's (1988) work on the language of uncertainty shows that there is often more than the literal meaning implied in the use of a term, such as contextual and relational information or some underlying "other" message. The use of language is very complex. The implications are that, even if a technique prescribes a set of "unambiguous" language and constructs, there may well be considerable ambiguity when it is used.

Preference influences. There are also likely to be individual preferences and corresponding biases for some techniques or specific tasks within techniques. As Puccio (1999, p. 171) relates:

The creative problem-solving process involves a series of distinct mental operations (i.e. collecting information, defining problems, generating ideas, developing solutions, and taking action) and people will express different degrees of preference for these various operations.

Couger (1995, p. 5) has noted similar preferences:

It is not surprising that technical people are predisposed towards the use of analytical techniques and behaviorally-orientated people towards the intuitive techniques.

In addition, there may be some biases between group and individual tasks, a point argued by Poole (1990), who notes that group interaction on such tasks is likely to be complex with many influences. This is a theme taken up by Kerr *et al.* (1996), who investigated whether individual activities are better than group activities (i.e. have fewer errors or less bias), but their findings were inconclusive:

The relative magnitude of individual and group bias depends upon several factors, including group size, initial individual judgement, the magnitude of bias among individuals, the type of bias and, most of all, the group-judgment process . . . It is concluded that there can be no simple answer to the question "Which are more biased, individuals or groups?" (Kerr *et al.*, 1996, p. 687).

To address the potential individual/group biases, many authors discussing the use of techniques recommend some consideration of the make-up of different groups (for example, Bicheno, 1994; Couger *et al.*, 1993). Unfortunately, they give limited practical guidance on doing so.

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(more) normative perspective. The underlying paradigm of a technique is likely to dictate the normative/descriptive characteristics of the technique. There is an in-built bias in techniques based on normative principles and the bias is self-perpetuating.

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Framing situations in either a negative or a positive perspective is likely to influence problem cognition, particularly on estimating the likelihood of events (Tversky and Kahneman, 1973). Milburn (1978, p. 17) identified a "time influence" on viewing problem situations, particularly with positive and negative events: negative events are seen as more likely in the short term while positive events are seen as increasingly likely over time. This, Milburn (1978) argues, "might help explain why often so little long-range planning is done: if one feels that things are bound to get better later on, no urgent pressure is felt to plan for problems which might occur later" (Milburn, 1978, p. 26). The implications are that the way in which a technique frames a problem situation, both in a positive/negative way and in a time perspective, will influence problem cognition, particularly with regard to the perception of the likelihood of events.

Another major area in which a technique can influence cognition can be deduced from support theory (Tversky and Koehler, 1994), which indicates that support for an option will increase, the more the option is broken down into smaller component parts with each part being considered separately. The more specific the description of an event, the more likely the event will seem. The implications are that the more a technique breaks down a situation into component parts or alternatives, the more likely the situation will seem. In addition, a technique's underlying paradigm is likely to dictate whether or not a problem situation is broken down into increasingly smaller component parts or if a situation is represented in a negative or positive light. This would seem to explain the predominance of techniques used in IS that use functional decomposition as the basis of analysis (e.g. dataflow diagrams and other techniques of structured approaches). Alternative techniques might look into problem situations holistically, such as rich pictures (Checkland and Scholes, 1990; Avison and Wood-Harper, 1990). These are less well used in the IS domain.

Structure influences. Prescriptive structure is also likely to exert influence on problem cognition. For instance, hierarchy and tree structures are likely to exert some influence on problem cognition in binding attributes together (for example, on the same part of a tree structure) and limiting items to the confines of the imposed structure. In cognitive psychology, this is known as category inclusion (Anderson and Bower, 1973). "One enduring principle of rational inference is category inclusion: categories inherit the properties of their superordinates" (Sloman, 1998, p. 1). The implication is that techniques dictating hierarchical structures will force a (self-perpetuating) category inclusion bias. An element in one branch of a hierarchical structure will automatically have different properties from an element in another branch of the hierarchical structure. For instance, taking a functional breakdown of an organization (as in Yourdon and

- inability to see the problem from various viewpoints;
- saturation (for example, disregarding seemingly unimportant or less "visible" aspects); and
- failure to utilize all sensory inputs.

(2) *Emotional blocks:*

- fear of taking risks;
- no appetite for chaos;
- judging rather than generating ideas;
- inability to incubate (ideas);
- lack of challenge and excessive zeal; and
- lack of imagination.

(3) *Cultural and environmental blocks:*

- Cultural blocks could include:
 - taboos;
 - fantasy and reflection seen as a waste of time;
 - reasons – logic, numbers, utility, practicality are seen as good and feeling, intuition, qualitative judgments are seen as bad; and
 - tradition is preferable to change.
- Environmental blocks could include:
 - lack of cooperation and trust among colleagues;
 - autocratic boss; and
 - distractions.

(4) *Intellectual and expressive blocks:* use of appropriate cognitive tools and problem solving language.

These "blocks" indicate that techniques could have a variety of adverse influences on problem cognition. The influences could derive from each of the four areas identified (for example, "blinkered" perception from a particular perspective, a failure to provide emotional support as a transitional object, suggesting a flawed approach and logic, and not providing appropriate cognitive tools).

Visual and linguistic influences on problem cognition

Gestalt psychologists. One of the earliest and most influential movements in cognitive psychology has been that of the Gestalt psychologists, initiated by Max Wertheimer, Wolfgang Kohler and Kurt Koffka (Wertheimer, 1923; Honderich, 1995, p. 312; Gillam, 1992):

In Gestalt theory, problem representation rests at the heart of problem solving – the way you look at the problem can affect the way you solve the problem ... The Gestalt approach to

- show data relationships (entity-relationship models);
- show how data changes over time (entity life histories);
- analyze processes (dataflow diagrams);
- understand the decision-making process (decision trees);
- show how things interact (matrices);
- analyze hierarchical structures (structure diagrams);
- analyze projects and their resource requirements (PERT);
- analyze possible outcomes (SWOT);
- see how previous experiences can inform new ones (case-based reasoning); and
- understand the roles of people (stakeholder analysis).

We might classify techniques according to their major characteristics. Some characteristics of a technique are explicit, for instance, where a particular visual representation is prescribed. Other characteristics may be less obvious, such as that of an underlying paradigm. Many of the characteristics are interwoven. Thus, the visual, linguistic and goal attributes might be dictated by the genealogy and paradigm of the technique. The attributes of techniques include the following:

- visual attributes, for example, visual representation and structure of technique output;
- linguistic attributes, for example, terminology and language used – not just English language, but also others such as mathematical and diagrammatical (Adams, 1987, p. 103);
- genealogy attributes, for example, history of a technique or related technique;
- process/procedure attributes, for example, description and order of tasks;
- people attributes, for example, roles of people involved in tasks;
- goal attributes, for example, aims and focus of technique;
- paradigm attributes, for example, discourse, taken-for-granted elements, cultural elements;
- biases, for example, particular emphasis, items to consider, items not considered; and
- other attributes, for example, techniques or application-specific attributes.

However, the world of techniques is more confused. The same techniques can be advocated in several domains. Thus, PERT charts can be useful in controlling any project, not just information systems projects. Techniques play an influential role in how an information system is developed and, to some extent, the selection and use of techniques distinguish one development

Although there are many claims about their benefits, methodologies have come in for much criticism. They are seen as over-complex, requiring special skills, inflexible, expensive, narrow in scope, and their use does not necessarily lead to increased productivity (Avison and Fitzgerald, 2003, pp. 542-55). Fitzgerald (1996, 1997), Lyytinen and Hirschheim (1987), Wastell (1996), Whitley (1997) and Wynekoop and Russo (1995), among many others, supply supporting evidence. Software tools and toolsets also have their detractors. They require staff education, training and consultancy (a considerable time and money overhead), they are difficult to integrate into the organization and may cause at least an initial reduction in productivity and, like methodologies, they do not guarantee success (Avison and Fitzgerald, 2003, pp. 341-3). Again, Stone (1993) and de Grace and Stahl (1993), among many others, supply supporting evidence.

Techniques, on the other hand, are largely seen as benign, supporting the work of the developers and users. This paper suggests that this is not necessarily the case. The specific characteristics of techniques are likely to affect developers' understanding of system requirements and problems. In effect, they frame or blinker the way their users perceive the problem under review. In this paper, we categorize over 80 techniques used in information systems development in this regard. Use is made of key works from the cognitive psychology literature, particularly those on "framing influences" (Tversky and Kahneman, 1973, 1974), which is referred to as the "framing effect" in prospect theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). These terms have the same meaning: the understanding of a problem is profoundly influenced by how the problem is represented. Information systems development techniques offer potential for these potentially negative framing effects, for instance, in defining how a technique may identify, collect, collate, analyze, process, represent and communicate a set of requirements.

By examining the characteristics of techniques in detail, particular attributes are identified. One prominent set of attributes relates to the representational characteristics of techniques, such as visual presentation and language used. To give one example, decision tables and decision trees can represent similar information, and yet their diagrammatic forms and related text are very different. Similarly, structured English and structure diagrams might be alternative techniques to represent process logic, yet their form is very different. These representational attributes provide one dimension to our classification of techniques. In addition, examining the taken-for-granted paradigm of a particular technique provides a further dimension influencing problem understanding. The most obvious differentiation here is whether they are open or closed. Techniques that impose a strong hierarchical structure are likely to have closed dispositions. They are more formal and structured and are more restricted in scope. Thus, dataflow diagrams might be seen as being on the closed end of the continuum, with rich pictures on the open end. Rich pictures attempt a systemic understanding of a problem situation. The developed classification is applied to development techniques (see Appendix).

EDITOR

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Manager, Knowledge Mapping, Intel Information Technology
E-mail: Eleanor.Wynn@intel.com

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E-mail: e.a.whitley@lse.co.uk

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ISSN 0959-3845

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Printed by Printheus Group Ltd, Scirocco Close,
Moulton Park, Northampton NN3 6HE

*Proceedings
of the*

**Sixth International
Conference on Electronic
Commerce Research
(ICECR-6)**

Dallas, Texas, USA

October 23-26, 2003

Sponsored by

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Personal trust space in mobile commerce

CARL ADAMS*, DAVID AVISON# and PETER MILLARD)*
*Department of Information Systems and Computer Applications,
University of Portsmouth, UK

#Department SID, ESSEC Business School, France
(corresponding e-mail: Carl.Adams@port.ac.uk)

Abstract

As the mobile phone evolves into a truly multimedia portable and personal device with increasingly impressive capabilities offering global communication, entertainment and information services, the future of mobile commerce seems assured. However, for this future mobile commerce to reach its potential consumers need to be able to *trust* the mobile infrastructure and services. This paper explores trust in this developing dynamic mobile domain. It reports on a study of students' use patterns and attachment to their mobile phones in three different countries (France, China and the UK). The results of the study show that the student cohorts have a close attachment to their mobile phones, literally not wanting to leave home without them. Mobile phones operate as a very personal and personalised device providing more than communication support. However, herein lies a dilemma: the very personalised support nature of the devices offers a firm base for developing trust relationships in mobile commerce, however the very same personal attributes would also make devices particularly prone to breaches of trust.

To help understand trust in mobile commerce the concepts of *personal trust space* and *personal trust device* are developed. A personal trust device, such as a sophisticated mobile phone, is likely to inform and define personal trust space. With these concepts we can explore the nature of trust in the mobile arena and identify elements that would impact the trust relationship.

Keywords: personal trust space, trust devices, trust, mobile commerce

Introduction

This paper examines aspects of trust in the developing mobile commerce arena. The humble mobile phone is evolving developing impressive capabilities as a result of converging technologies including computing, telecommunications, PDAs, games consoles, digital imaging and music; sophisticated applications ranging from banking to socialising to gaming and; relatively cheap infrastructure and unit costs. Some of the latest mobile devices offer streaming video, pictures, text, access to data and the Internet and voice capabilities. It is easy to see why some business and social commentators argue that the future is 'definitely mobile' [Thomas, 22; Economist, 7]. There seems to be support for this view with adoption rates of mobile phones outstripping most other technologies, for instance in the UK, in 2003, there are more people with mobile phones than have access to the Internet [Ofcom, 18]. The adoption pattern of mobile phones in the UK also show some interesting characteristics. For instance, in 1996-97 only 17% of households in the UK had mobile phones, rising to 47% in 2000-01, but interestingly over two thirds of those were in the top income group, compared with under a quarter in the bottom group. However, more recently the rate of increase has been highest in the lowest income groups. The mobile phone in the UK is now a common communication tool and accessory across income, age, profession or any other grouping in society. Indeed many low-income groups have forgone the landline telephone for the mobile phone. The mobile phone has changed rapidly from being a relatively high status item to being a common ubiquitous communication tool.

For further indication of the potential for mobile services look to China which at the start of 2003 had the largest user base, 130 million [Cellular, 5], and one of the fastest adoption rates of mobile phone technologies in the world. The number of mobile users in China dwarfs the number of PC users and Internet users. It is easy to see why with mobile infrastructure being cheaper than landline based infrastructure and even the most sophisticated hand held mobile units costing less than basic PC units. There is considerable investment in mobile technologies in China and mobile technologies may leapfrog landline technologies. Internet access in the future in China may well be predominantly based on mobile access. In the

West mobile technology adoption is at a more developed stage, and in the fairly near future a significant proportion of Internet access in the West is also likely to be based on mobile technologies. The personal and portable attributes along with powerful multimedia capabilities of the mobile devices are strong indications of the potential for mobile services.

One view of this mobile future was represented by the British Telecom's marketing in the late 1990's proclaiming that "Geography is History": the message evidently being that in a future with pervasive access to a rich host of cyberspace services, location would no longer be a limiting factor in accessing such services. People will have the ability to work, communicate and interact independently of geographical location and even on the move.

However, before people fully embrace these developing mobile technologies people will need to have trust in these technologies: Trust is one of the fundamentals of business and social transaction and interaction. This paper examines trust in this 'dynamic mobile context. It uses a study based on a Mobile Use Questionnaire [Adams et al, 2; Adams and Millard, 3] to examine the existing relationship people have with their mobile phones and the likely impact on developing trust in that relationship. The study highlights that the mobile phone provides a firm base for developing a trust relationship. However, it is a fragile base and the personal attributes could easily be misused resulting in serious infringements to this trust relationship. Two concepts are developed to explore the mobile trust relationship: personal trust space and personal trust devices.

The structure of the rest of this paper is as follows. First, the paper reports some findings from an investigation into peoples' relationship with their mobile devices, then concepts of personal trust space and devices are developed using key works on risk and trust in society. The relationship between trust space and trust device is also explored and applied to the mobile context. Finally the paper discusses the implications of personal trust space and personal trust devices for the future 'mobile' society.

Mobile use and attachment: Results of study

The study is based on a Mobile Use Questionnaire [Adams et al 2; Adams and Millard 3] which examines personal attachment to mobile phones, phone use, customisation, concerns and adoption patterns. The questionnaires were distributed to students at Universities in three different countries, France, UK and China. In all over 500 responses have been collected. In addition, the students in the French and UK Universities were 'international' with at least 17 nationalities represented. The proportions were approximately just over 45% British, 30% French, 10% Chinese and the remainder a mix of nationalities. The students from France and the UK consisted of Masters students and undergraduate students, while the Chinese university students were in their second year of study. The questionnaire has been supplemented with observations and interview sessions, particularly with working groups such as health care-workers. However, the main focus of this paper is with the questionnaire results.

The questionnaire consists of a double-sided A4 sheet with several tick box questions, the first set of which asks for personal detail (age, gender, nationality), and details of the type of mobile phone used and customisation of the phone. No names or identifying information is collected to ensure that the responses are anonymous. There then follows a set of questions to gauge how closely people are attached to their phones and how much of a 'support mechanism' the mobile phones are for people. The same questions were asked about another personal artefact, the watch, to provide a comparison.

Attitudes towards mobile phone:

If you left home and two minutes later realised you have left your mobile phone at home, would you go back for it if you were:

	Yes	Probably	Probably not	No
Going on a long journey?				
Just going down the shops?				
Going to work, college or school?				
Going to work, college or school and were already 5 minutes late?				

The results of these hypothetical questions regarding whether people would go back home to get their phone if they realised they had left it behind, were very revealing. For the 'long journey' question, the highest proportion over 80% of respondents said 'yes'. This was roughly the same across gender and across the different student cohorts. A very definite response somewhat higher than the other situations. This may imply a strong need for the mobile phone, or something that the mobile phone provides, when going on a 'long journey', a concept that invokes many images, including the travelling, the distance and time away from home, possibly going through and to unknown location. Clearly the respondents saw a different need in requiring their mobile phone in the 'long journey' situation than the other situations.

For the 'going to work/college' question, which effectively indicates day-to-day activity, over 70% of respondents said 'yes' (39%) or 'probably' (32%) and less than 10% said 'no'. Clearly it was important for these respondents to have their mobile phone with them for day-to-day activities. The 'yes' and 'probably' responses for all these questions were far higher for mobile phones than for the comparative personal item, the watch. The respondents seemed to be more 'attached' to their mobile phones than to their watches.

Reasons for having a mobile phone:

Please indicate the level of importance for each of the following reasons for you having a mobile phone

	Very high	High	Medium	Approximately 55% in the 'very high' and 'high' category (and 35% in the 'medium'). 'Loss of personal information' indicated a similar high level of concern with approximately 55% in the 'very high' and 'high' category (and just under 30% in the 'medium'). The loss of the phone itself seemed to be less important than the loss of the phone's personalised functions, such as personal data.
Being able to contact other people any time or place				
Being able to be contacted by other people any time or place				
Makes me feel safe when I am driving				
Makes me feel safe when I am walking				
Because my friends have them				
Because everyone has them				
Because they are cheap to buy				
Because they are cheap to make calls on				
Other (please specify)				

The 'reasons for having' mobile phones are also revealing. Being able to be contacted and to be able to contact other people were, perhaps unsurprisingly, the two highest responses: Being able to contact other people resulted in just under 60% 'very high' and approximately 30% for 'high'. Being able to be contacted by other people were just over 50% as 'very high' and just under 40% as 'high'. The locus of control (being able to be contacted and being able to contact) is interesting as many people indicated one higher than the other. For some people it is more important to have the ability to be contacted than to be able to contact other people; for others it is the other way round.

A substantial proportion of respondents indicated that the mobile phone makes them feel safe when driving a car (approximately 30% rated the level of importance from medium to very high) and to a lesser extent when walking (approximately 20% rated the level of importance from medium to very high). Slightly different figures were found with a recent UK poll by MORI which found that very nearly half (49%) of mobile phone users 'say their mobile makes them feel safer and more secure', and fully 38% simply 'say they cannot do without their mobile phone' [The Observer, 17].

The questionnaire also asked for areas of concern regarding using mobile phones. 'Theft of mobile phones' had a response of approximately 43% in the 'very high' and 'high' category (and 30% in the 'medium'). However, 'Losing mobile phones' indicated a slightly higher level of concern with approximately 55% in the 'very high' and 'high' category (and 35% in the 'medium'). 'Loss of personal information' indicated a similar high level of concern with approximately 55% in the 'very high' and 'high' category (and just under 30% in the 'medium'). The loss of the phone itself seemed to be less important than the loss of the phone's personalised functions, such as personal data.

These results seem to imply that the mobile phone is more than a communication device: the mobile phone is fulfilling support functions contributing to perception of being safe, keeping and providing personal information, as well as providing a contacting and contactable function. The respondents seem to have a very close attachment and relationship with

their mobile phones. The relationship seems to be complex and to understand this relationship further the next section examines the literature on trust and risk. The next section will examine this personal trust relationship with mobile phones.

(A follow-on study is underway consisting of wider data sample involving students from Universities in Africa, Scandinavia and North America. In addition other main user groups are being included such as 15-18 year olds, working people and older members of the population. It also involves more qualitative activity such as interviews and focus group sessions.)

Personal trust devices and personal trust space

In our exploration into peoples' relationship with their mobile phone, particularly as it related to developing trust, we will start with examining another related concept, risk. It has been suggested that society is getting more 'risky' so for any investigation of trust in the wider mobile arena one must consider the likely impact of this risky society. The sociologists Ulrich Beck and Anthony Giddens have both produced seminal works on risk in society: Beck's *Risk Society* [Beck, 3] and Giddens' *Modernity and Self-Identity* [Giddens 8]. Risk and trust are key and interrelated elements for both Beck and Giddens. For Beck, and similarly Giddens, risk is seen as at the heart of 'reflective' or 'late' modernity, resulting in a new society, 'the risk society'. Giddens is more concerned with how individuals relate to this new society or order. Beck thus holds that "forces in the modernization process, hazards and potential threats have been unleashed to an extent previously unknown" [Beck, 3, p19]. Giddens' late modernity is typified by an expanding scope of risks into the global sphere alongside rapidly developing technologies. Herein lies a paradox, with on the one hand less individual life-threatening risks (eg treatments for life threatening diseases) yet on the other hand more technology enabled high-consequence risks where no one escapes: risk is thus universal. For both Beck and Giddens technology and science play an important role in a new risk society/culture that is no longer willing to uncritically accept as truth the claims of scientific knowledge, "science and its claim to truth are at issue in the risk society" [Giddens, 8, p203]. Technology is seen as providing increased diagnostics capabilities, being able to identify and categorise a range of new

problems and risks. However, technology is also seen as unable to provide solutions to the rapidly expanding set of new risks and problems. Technology therefore exposes society to more risks yet cannot meet society's heightened demands to address them. However, problems of risk are primarily seen by Beck and Giddens as people or social problems, where technology is an integral part of, or object in, the changing culture(s). The key concepts here are that we are in a perceived more risky society and that technology plays a role in understanding the risks and addressing the risks.

Another influential social scientist who has written extensively on risk is the anthropologist Mary Douglas, who published a seminal work on risk with Aaron Wildavsky [Douglas and Wildavsky, 6]: *Risk and Culture: an Essay on the Selection of Environmental and Technological Dangers*. Their work brings a cultural and social organisational aspect to risk. People within similar forms of social organisation have similar risk attributes, such as taking or avoiding similar types of risks. Much of Douglas' work focuses on explaining why different societies and groups within societies view risk differently [Caplan 4, p12]. A further dimension that Douglas brings to our understanding of risk is culture and power (political), particularly the distribution of power and the distribution of incurred risks. Predating Douglas by more than half a century is the work by the social anthropologist Margaret Mead, *Coming of age in Samoa* [Mead 13]. Mead looked at, amongst others, attitudes towards relationships and risk among adolescent girls on the remote island of Samoa and made comparisons with 'similar' adolescent groups in America. Key findings from Mead's work is that decisions are made within the social setting of ones peer group. To understand individual risk/trust decisions requires some understanding of the social setting and influences at play: risk/trust has to be viewed from the setting of the sub-culture.

From the (cognitive) psychology field, seminal works on risk are dominated by the partnership between Kahneman and Amos Tversky, particularly with the development of prospect theory [Kahneman and Tversky 9] and further enhancements with cumulative prospect theory [Tversky 1992] which describe decision-making under risk conditions. The pertinent characteristics of prospect theory are the 'framing effect' (ie different representations of

essentially the same situation will result in a different preferred 'prospect' or choices) and that people will generally be risk adverse (ie. the fear of loss will be greater than the pleasure of a gain of the same value), however, when people are in a loss situation they are more likely take risks.

The UK Royal Society commissioned a study investigating the public's perceptions of risk [Royal Society, 19], the report shows the wide spectrum of risk related interests, concerns and views: It was clear that the 'public' is not one homogeneous group but is many faceted consisting of many interested groups with diverse concerns. The diverse subgroups perspective being consistent with the sociologists views of risk as a (peer) group and social construct.

In a more current set of fairly diverse works collated by Pat Caplan in *Risk Revisited* [Caplan, 4], risk taking and attitudes towards risk are examined within the context of complex and distinct social groupings. Caplan's own contribution looks at risk, knowledge and trust within a largely farming community in West Wales during the very uncertain time of the British BSE beef crisis. Amongst the key questions Caplan addresses is how do people develop knowledge about a 'risk'. Caplan shows that 'knowledge and trust are indeed intimately linked in the context of the BSE crisis' (p185), and, 'On the whole ... apart from some members of the alternative community, there were few people in this area who give up eating beef as a result of the BSE scare' (p190)

The rationale people gave for still eating beef (when other communities were not) was that they knew where the meat was produced 'This theme of "knowing where it comes from" was a very important one which recurred in many interviews' (p192).

This ties in with a response from the farming community to develop trust in the beef industry by localising the source, as Caplan's observations of a butchers shop sign show:

"Dinas Beef

Preseli Lamb

Pembrokeshire pork

What struck me was that each of these meats was 'localised' at a different level: pork was from Pembrokeshire, the county; lamb was from Preseli

Hills (the main sheep-rearing area in the county), while beef, potentially the most dangerous, was from the next village, three miles up the road." (p198)

Caplan argues that there is a *politics of location* in relation to risk perception, "people do perceive risks according to their social location and this is likely to affect their behaviour" (p199).

Wastell [25,26] examined the use of (development) techniques in information systems, and identified two concepts which seem relevant to the discussion: that of 'social defense' [Menzies-Lyth 14] against the unknown and, 'transitional objects and space'. The social defence mechanism relates to following the rules of a technique as a means of dealing with the unknown. The transitional objects and space relate to using known (and trusted) objects and space to deal with new situations, much as a child will cling onto a favourite toy if placed in new (frightening) environment. The implications of these concepts are that known and trusted tools, familiar procedures and processes are likely to have an impact on developing trust. 'Trust' in the digital age relies heavily on technological tools and mostly automated procedures and practices.

In the mobile digital world, when one makes a 'risky' decision, we contend that it is considered within a *personal trust space* which has many factors influencing whether the option is taken to trust or not to trust. Prospect theory shows us that framing of the situation will influence the perception of how 'risky' it is. It also shows us that although people will generally be risk adverse, people will be more likely to take risks in a loss situation. From the sociologists, Giddens and Beck we see that people are faced with more risk. In the risk society there is the perception of increased risk and that technology plays a key role in diagnosing and perpetuating risk, yet falls short of providing solutions. From support theory we see that the natural outcome of the diagnostic capabilities technology, enabling identification, categorising and describing risks in minute detail, and quickly communicating risk information in a rich tapestry of multimedia, will potentially be to make the risks seem more likely.

From social anthropologists, such as Mary Douglas, we see that risk taking is a social activity where the changing 'culture' of ones peer or social group

plays an important part in deciding which risks can be taken and which cannot and what information is deemed reliable or not. From the sociologist Caplan, we see that developing trust as per the more risky decisions requires more localised information, reverting to "knowing" where it comes from, before trust is manifested. Location, and known localisation is required for 'riskier' decisions.

[From the developing naturalistic decision making field we see that people in interrelated environments, particularly safety critical environments, relying heavily on each other, need a more proactive involvement from each player: they 'trust' each other to take appropriate actions.]

From Wastell's concepts of 'transitional objects and space', we see that people will fall back on support mechanisms to address the uncertainties of the unknown, much as a child would use a familiar toy in a new environment to gain confidence and comfort.

So the *perception* of risk is growing faster than the actual risk, and faster still than the capability of technology to address the risk. Also, the natural result of this increased risk is that individuals have a need to fall back on some form of 'trust zone' where they feel comfortable to make a trust decision. This we call personal trust space, and which is likely to have some personal support objects.

Personal trust space is informed within a physical and perceived location and social setting, heavily influenced by peer group norms, the particular characteristics of the environment, how these are presented, and, support *mechanisms*, notably objects offering very personal and personalised support. These objects we refer to as personal trust devices.

Discussion

The study results seem to be consistent with the developed concepts of personal trust device and personal trust space. We contend that people are using their mobile phones to provide support in risky, uncertain situations, such as going on a long journey. Even conducting the day-to-day activities of going to work or college people seem to be using their mobile phones to bring a bit of their personal 'home' space with them in which they can be

contactable and contact other people. There seems to be a complex and close relationship developing between people and their mobile phones. Indeed, it seems common practice for users to literally not let their device out of their own private physical space (it is in their pocket all day and on their bedside table all night). Symbolically, at the very least this does seem to speak of a type of intimate relationship - a person's pocket is surely just about as private and as personal and as trusted a physical space as any they possess! The sociological reality of a user's attachment to their personal mobile device is clearly evident: try asking an owner if you can borrow theirs for a day. In short, to the extent that a user's relationship with their mobile device is an intimate one, it is also, inherently a trust relationship. Such a trust relationship potentially offers a firm base for developing a mobile commerce relationship. Attributes that enhance personalisation, personal support, control over interactions and accessibility are likely to have a positive impact on developing personal trust in the use of such devices.

However, there are also surveillance concerns with this powerfully personal trust device. The capabilities to accurately identify geographic location and transmit and receive information concerning that location hold many dilemmas. For instance, the growth of picture messaging capabilities and in the future of streaming video; picture enabled mobiles have already been banned from public spaces (from swimming pools and creches to general public buildings [Observer, 16]. There is clearly a conflict between what can be used to enrich remote social interaction and what can also be used to facilitate covert, and potentially socially unacceptable, surveillance.

From a mobile business perspective there are other concerns, such as the ability to 'know' and 'audit' peoples' geographic movements. There is a clear potential threat in terms of allowing variously 'wanted' and 'unwanted' others (egs. authorities, businesses, criminals, associates and even friends or lovers) to monitor their location and activities: thus they can be seen as further facilitating a "surveillance society" [Lyon, 12] on the move. The monitoring capabilities offer new market opportunities to attract and interact with mobile consumers. However, this holds a problem and corresponding obligation. Businesses must be aware that they are encroaching upon someone's personal trust space and that such an

encroachment may impact that person's trust relationship. The control must be firmly in the hand of the user. If blanket unsolicited mobile spam results then trust in the mobile infrastructure will evaporate. An important business principle for future mobile commerce might well be a need to take account of personal trust space, possibly ensuring that only the owner of a personal trust space can solicit entry to it. In effect requiring a positive request for information by users. One can see much potential for unsolicited location based 'm-spam', say receiving restaurant adverts shortly after dining out. In sum, personal trust space and trust devices, certainly have plenty of business potential beyond the use of secure business-to-business interaction. For m-commerce to reach it's full potential in the future however the significance of trust space must be sensitively catered for.

In conclusion, a mobile personal trust device offers one avenue to developing trust in the mobile future, on which business and social interaction depends. Critically, business needs to freely accept and even embrace the evidence that the current mobile phone and the multimedia mobile devices of the future are not just tools to support business activities, but that rather their use is intrinsically and primarily related to intimate socialising functions, interpersonal communication and personal support mechanisms. This very personal mobile device provides a firm base for developing mobile commerce. However, misuse of the capabilities of such devices is likely to have a considerable negative impact on trust and use of those devices. People could start to see the mobile device as an intrusive spy in the pocket, invading their personal trust space, rather than the more powerfully enabling personal support device. Trust plays a fundamental role in business and social relationships, and potentially a personal trust device offers a firm basis for developing trust relationships and enhancing peoples' personal trust space.

Mobile business players of the future need to be aware of the delicate balance between successfully developing a market offering huge potential and over exploiting mobile capabilities to the detriment of the user's own control of *their* personal trust space.

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Stats example. Research Training

TIMES COMMENT

Saturday Times, 22 July 2006

P21

JANICE TURNER

Stop whingeing about the heat. So you prefer the dank winter?

PAGE 24

STEPHEN BAYLEY

Ah, the bikini: four triangles that reflected the spirit of our age

PAGE 25

The truth about those little red lights: a tale of power and poppycock



MATTHEW PARRIS

THIS IS A STORY about dodgy statistics. It is intended more as a cautionary than a moral tale so you will find no villains or heroes in it. Though interesting, the issue itself is secondary. Being neither a statistician nor an engineer, I may in what follows make blunders of my own: but my purpose is not to initiate you into the mysteries of energy conservation but to offer a real-life example of how a dud fact can enter the national mind with no valid passport and no real corroborating paperwork.

Some of us are sure we saw or heard of a claim by the Chancellor, in April, that "up to 10 per cent of the electricity supply" is being wasted on electrical appliances left on "standby". I thought I heard this on a BBC radio news

Ministers love nothing better than a simple, graphic certainty. And so it was that last week Alistair Darling, the Trade and Industry Secretary, in a statement to Parliament on the energy review, declared: "Mr Speaker, it is estimated that leaving electric appliances on standby uses about 7 per cent of all electricity generated in the UK. So we will work with industry... to phase out inefficient goods limiting the amount of standby energy wasted."

"About 7 per cent?" A new figure? Or is that "about 10 per cent"? More importantly, where did the phrase "all electricity generated in the UK" come from? We need not bother ourselves with this mystery because a written correction came fast from Mr Darling: "Further to my statement to the House on Tuesday July 11, it has come to light that the statistics quoted on electricity appliances on standby should have referred to 8 per cent of electricity used in the home, not 7 per cent of the electricity generated in the United Kingdom." This erratum slip reduced the estimate for wasted power to less than half the earlier figure — but, hey-ho, what's a few hundred gigawatts between friends?

Friends of the Earth took a similarly

ment estimates that the figures for standby wastage "range from 3 to 10 per cent of residential electricity use".

But from where do such estimates come? I am redirected again, this time to a baby of the Department of Environment, Food and Rural Affairs, named Market Transformation Programme. Its Report BNXS 36 is headed *Estimated UK Standby Electricity Consumption in 2004*.

Here at last are hard figures — or what seem to be. 9.2 terawatt-hours wasted per annum: about 360kWh per household, 8 per cent of domestic electricity consumption, costing about £27.50 per household.

In other words, about £10 from each of us. You could recoup that by replacing one 100w tungsten light bulb with a low-energy equivalent (though in winter an appliance on standby is slightly helping to reduce your heating bill). Curiously, the MTP's 9.2 terawatt global figure includes commercial, retail, hotel and office use. To divide this by the number of private households seems misleading — if that is indeed what they've done.

Have they? I put a call in to the Defra press office, who promise someone will come back to me — but nobody does. Finally, there is a need for

THE WEEK

Accusation of the week

"We have to ask whether some Western governments are catching up with the consciences of their own people"

Rowan Williams says the public wants the Government to press for a ceasefire in the Middle East

Inconvenience of the week

"Why does it have to be a furtive affair?"

Not John Prescott's latest indiscretion. Phil Woolas MP is campaigning for the non-paying public to be allowed to use restaurant toilets

Joke of the week

"I know that he does not like being interrogated, but with the way things are going at Scotland Yard, he had better get used to it"

David Cameron makes a point about the Prime Minister's evasiveness

Impasse of the week

"May I just point out that our influence with Hezbollah has been somewhat limited?"

Tony Blair tells Sir Menzies Campbell why he can't just get on the phone and call for peace in Lebanon

SUMMER CLEARANCE SALE

All samples and excess stock must go!

'Same quality as the originals at a fraction of the price.'
by John Price, The Times, May, 2006



briefing that led him to report on April 20 that "the Chancellor will be addressing the UN on the need for international co-operation to protect the environment. He intends to highlight the 'huge waste' from consumer goods left on standby — about 10 per cent of the electricity supply."

The *Evening Standard* reported likewise. Gordon Brown flew off to speak in New York: "Consumer goods left on standby worldwide are responsible for 1 per cent of global emissions."

That is, of course, a very different claim, which Mr Brown's civil servants say is partly based on an academic study in California. Of which more later.

As for the 10 per cent claim, the Treasury informs me (in so many words) that if it isn't true then Gordon Brown didn't say it, we must have misheard, and even if he did, it would be somebody else's fault — probably another department, so why don't I talk to them? Funny how civil servants begin to resemble their masters.

Meanwhile, it's fair to say that the startling "approximately 10 per cent" figure has entered the public imagination. Everyone I ask has noted claims about the wastefulness of appliances in standby mode. Politicians — who have to be communicators — need striking killer facts, and Westminster has embraced this one with a passion. Chris Huhne, the Liberal Democrat Environment spokesman, has been asking parliamentary questions about it, and so has Baroness Perry of Southwark. There have been many newspaper reports: "Energy waste soars as we fill our homes with gadgets" said the headline in the *Daily Express*.

The figure was less than half — but hey-ho, what's a few gigawatts between friends?

was honest, and made the not unreasonable point that whatever the figures, there's a hell of a lot of electricity being wasted in lots of ways you might not have thought about.

Nevertheless, in the belief that the facts do still matter a bit, I tried to find out where all these figures were coming from. First I was directed to *A Worldwide Review of Standby Power Use in Homes*, conducted for the US Government by Alan K. Meier of the Lawrence Berkeley National Laboratory's energy analysis department. This is an old paper, published in 2000. It is carefully couched. It does not support the certitudes expressed by ministers or journalists. Dr Meier's report estimates that "between 3 per cent and 12 per cent of electrical power is being wasted on standby".

The guess is based on surveys in 22 countries. The United Kingdom has almost the best record of all of them: a fraction of the wastage in the United States or New Zealand. But in Britain only 32 homes were surveyed. There must (I thought) be a better basis for ministers' claims than a 20th-century survey of 32 houses. I inquired further and was led by the exceptionally helpful Institution of Engineering and Technology to a report, *The Rise of the Machines*, from the government-sponsored Energy Savings Trust. This docu-

figure comes from the MTP report. But where, in turn, did the MTP folk find their figures? My eye moves to the references quoted at the end of the report.

And what's this? Alan K Meier again: that old 2000 study. So I make one final dive into what is turning into our rather flimsy Holy Grail.

Near the end of Meier's report I spot this: "Estimates of standby power use and savings opportunities are based on just a few, scattered measurement studies... [they are] inadequate. More complete information is needed to answer these questions:

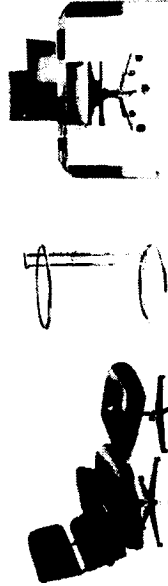
- ☐ What is the overall size of standby (nationally and globally)?
- ☐ What are the key contributors to standby?
- ☐ Is standby growing or declining?
- ☐ What are the potential savings from reducing standby?"

Meier is asking these questions! Everyone else is pointing to him as the man who answers them.

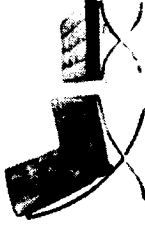
The truth is plain. Nobody has the least idea. All we do know amounts simply to this: that some small energy savings are available from switching some appliances right off.

At the start of the Iraq war, Jack Straw, then the Foreign Secretary, announced that Iraq was more than twice the size of France. Soon everyone was repeating this. Actually Iraq is smaller than France. But why fret? Journalists and politicians bring you the essential not the literal truth. The essential truth is that you must remember to unplug your mobile phone charger; and Iraq is awfully big.

Le Corbusier Leather Sofa was £950. NOW £379



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Barcelona chair and stool was £855-£950. NOW £199-£349



Mies Van Der Rohe Leather Day Bed was £1100. NOW £390



Le Corbusier Chaise Longue in Leather and Pony Skin was £499-£799. NOW £199-£399

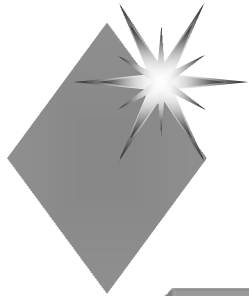
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MSc Degree Structure

Research Methods – 12 weeks or 150 hours study for 15 credits

Research Ideas and principles

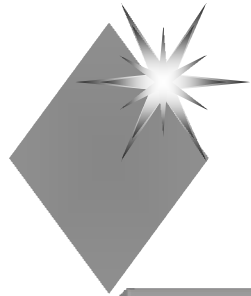
Statistics

Project – at least 18 weeks or 450 hours for 45 credits (about 15,000 words)

A research project of your own choice but University Approved

Project must have a strategic business IT outcome

Project must involve significant IT learning



Work Schedule – Research Methods

Research Methods Steps (parts of the assessment package)

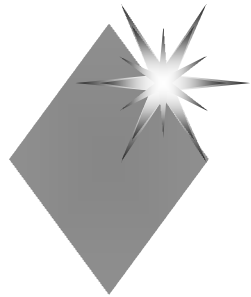
Assessment 1a Part 1 – get approval for a project idea

Assessment 1a Part 2 – online tests

Assessment 1a Part 3 – Literature Review & Project Specification

Assessment 2 – Statistics

Supervisor appointed and Research Project starts



Student Progress Marks and Warnings

During Research Method unit progress marks are awarded

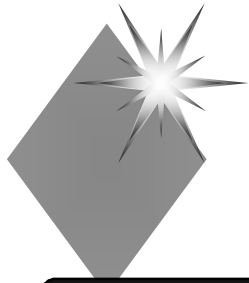
One attempt at each of 5 online test to gain a maximum of 5 marks

One attempt to gain project approval for a maximum of 10 marks

Deadlines – failure to meet due dates will normally mean unit failure

Assessment Instructions – failure to follow instructions means failure

English – if you language is judged poor then project cannot start

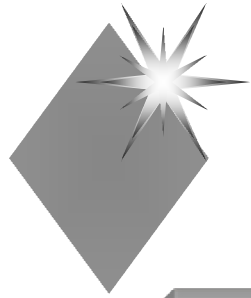


Project Styles

Engineering - where you build something such as a web site, invoicing system, requirements document etc

Study - where you look at a problem related to a topic area such as might occur in the use of say IT collaboration Tools

Review - where you review a topic of current interest by looking only at primary sources: journals or reports. This style will ONLY be allowed in exceptional cases where the topic is based on a new technical idea and the student can get access to journals and reports.



Degree and Project Style

Engineering Style Project

MSc Internet Systems Design

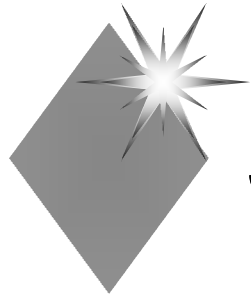
MSc eCommerce and Marketing

Study and Review Style Projects

MSc eCommerce and Marketing

MSc Marketing and eCommerce

MSc Strategic Business IT



Summary of what we will do

Define – Problem and associated target

Research Question – at a minimum linking problem and target

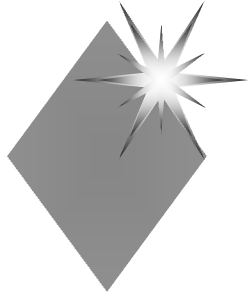
Outcome – the object to be generated: model, report, theory, a matrix,...

Aim – to link outcome and target

Objectives – a set of activities that generate minor project outcomes

Research Design Part 1 – define the data and state how it is to be collected

Research Design Part 2 – process the collected primary data to get the outcome



Basic Research Structure

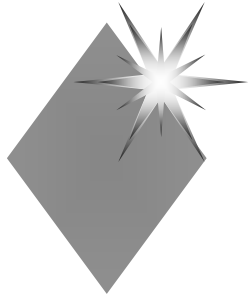
Topic Area – this just define the general area in which you are working This is a simple step and although part of the process is not a key elements in focusing

Problem – define a single significant problem

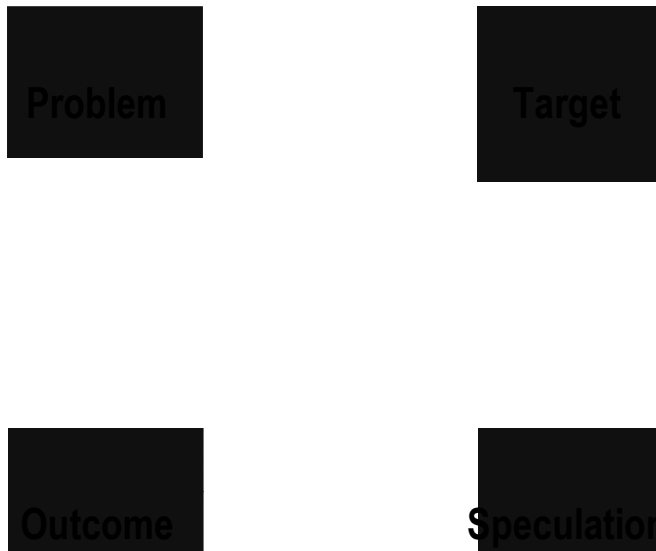
Target – say what real-world effects will be produced if we can solve the problem

Research Question – a lucid question that links problem, target, outcome and data

Outcome – what is it that you can produce that will generate the target effects



Cyclic Research Structure





Key Research Process

Suppose your problem is lack of sales staff productivity

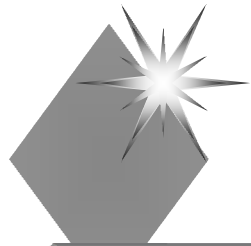
Then my target might be higher sales revenue

So I speculate that this low productivity might be due to lack of training, poor customer records, poor IT infrastructure, inefficient email, etc. But I decide email is a major cause of this problem

Next I collect data on email usage practices amongst sales staff

I process the data to produce my project outcome – a report that defines a set of Best Practice Strategies for email management

I generate this Best Practice Strategy outcome because I believe it will help resolve the email problem and hence I get to my target.



An Important Distinction

Problem - is something that is a matter of concern or debate in a given situation

Target – this is the real-world effect that you want to produce. It might be things like: improved network infrastructure, strategic Technology alignment, reduce network down time, a heightened awareness of security etc. (VERBS)

Outcome – this is what you produce as part of your project, dissertation or thesis. As we have seen the idea is that we can use this outcome to generate the target effects. Possible outcomes are: a model, an explanation of some behavior, a usage protocol, a feasibility report, a post implementation review etc (Nouns)

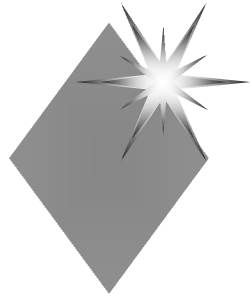
Features of an outcome - when you name your outcome ask: can I write it down, is it easily observable, can it be placed in a document, can it be sent to Portsmouth for marking. If it is any or all of these its probably an outcome



Can you make the Distinction

1. A strategy
2. Increased productivity
3. Better fit with technology
4. A best Practice Model
5. Improved sales
6. A security policy
7. Highly usable systems
8. Efficient network control
9. A pattern of work
10. A process flow
11. Simpler Web Page Access
12. A role description
13. Better trained operators
14. A list

15. A theory
16. A feasibility report
17. A computerised sales program
18. A post implementation review
19. A predicative report
20. A process description
21. A model or framework description
22. Improve IT management
23. A definition or set of definitions
24. A comparison matrix
25. A design
26. A methodology
27. A security protocol
28. Secure passwords



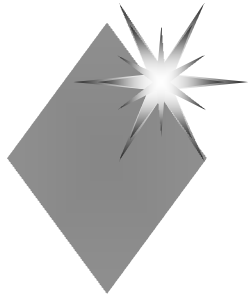
Projects must be Research Based

Research Based means you attempt to resolve a problem

Research Based means there will be a real-world effect if the problem can be solved and this effect is known as the target

Research Based means you have an idea as to what form a solution to the problem may take

Research Based means you define and collect original (primary) data that can be used to generate a form of solution to the problem



Primary Data

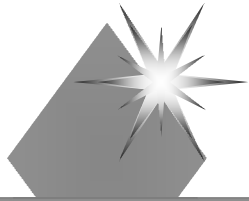
Primary Data - data that will not **EXIST** as a collection until **YOU** define and collect it for some purpose.

Primary Sources – the first recorded case of existing information contained in journals, reports, theses and some books.

Engineering Style: Primary data as the discovered requirements

Study Style: Primary data is as you define it and collect it, in for example in survey. document search. interview and so on

Review Style: Primary sources only



Primary Data Examples

Example 1. If I extract instances of phishing (problem) from an email log (secondary data) would that list of phishing instances be primary data?

Answer 1. It would be primary data even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data collection) did not.

Example 2. If I conduct interviews in order to discover a user purpose regarding illegal downloads (problem) would my transcripts be primary data?

Answer 2. It would be primary data since interview transcripts did not exist before the interviews took place.

Example 3. If I read reports (secondary data) on security violations (problem) for a company with a view to identifying the root cause of each violation

Answer 3. even though the violation reports exist (secondary data) the list of root causes (my primary data) did not.



Research Question

This is a way of capturing problem, target, data and a suggested outcome into one lucid and concise question that will form the focus of your research

Structure – it has typically 5 elements that you might use but do not worry too much about the order in which you present them although it would be odd not to have the interrogative at the beginning. (SPITS for short)



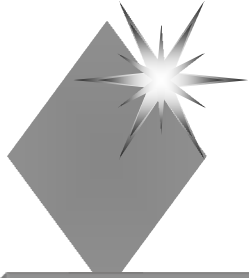
Spotlight – what sort area will the data come from?

Problem – this is about focusing on the problem itself

Interrogative – what is question key (how, why, what etc)

Target – what sort of real world effect is being sought

Suggestion – what sort of outcome are we looking for



RQ Answer Forms

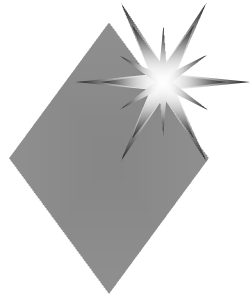
Interrogative words - Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.

Question that use: **does, is, are, what, when or can** will expect as an answer a fixed list of possibilities: yes/no or low, medium, high, etc

Question that use: **how, why, who or where** will expect as answer an explanation in the form of a: report, model, equation, theory, design, evaluation etc

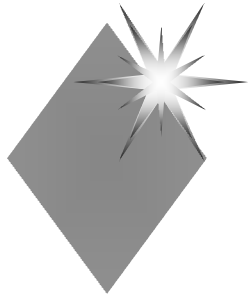
Question that use: **how, who or what** will expect as an answer an exploration in the form of a: list, explanation, comparison matrix, pattern, survey report, a theory etc

Question that use: **how, who or why** will expect as an answer a description in the form of a: report, process or procedure, model, policy, strategy, theory etc



Research Question Example

How (interrogative) can the billing cycle (problem) be improved by identifying and defining a best practice portfolio (suggested outcome) in order to improve the quality of response (target) to customers by reviewing the initial accounting processes stages (data spotlight)?"



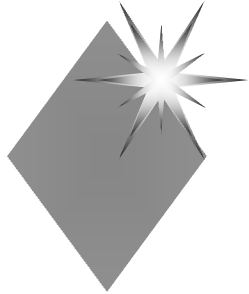
Common RQ Errors

Error Type 1: Not a Question - to an English speaker the following would not sound like a question, it would sound like a heading to a list of instructions or a procedure.

How to make business applications development productive at XYZ Corporation?

Error Type 2: Multiple Questions – It is not a good idea to try to put TWO (or more) questions into one as follows – (testing and bugs).

How can software bugs be minimised and the testing shortened in the development process of an Inventory Management system.

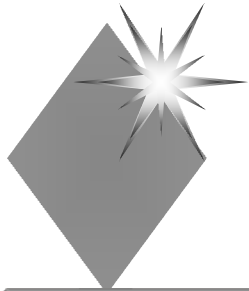


Common RQ Errors

Error Type 3 - Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example, it is easy to see that the answer is bound to be YES - of course a better work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this.

How can a business application development process increase the productivity at XYZ?" or

Can a better work-life balance be achieved with telecommuting for technical personnel?"



Common RQ Errors


Error Type 4: The question is a solution – in this class of error the question is worded in such a way that it is in fact a solution. The trouble with doing this is that it cuts off any further speculation about dealing with this problem idea and so the question becomes rather pointless.

What strategic business Indicators are available to drive the process of building a secure network infrastructure in order to ensure continuous business operations.

Here it looks as if the problem is "building secure network infrastructure" and what we want as a target is "continuous business operations". But in effect we are told to look for "strategic Indicators" as a solution to this problem theme.



Project Research



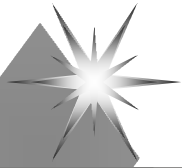
Phase 1 – define and collect primary data

If I extract instances of phishing (problem) from an email log that would be primary data because even though the email log is secondary data, the list of phishing instances (my primary data collection) as a collection does not.



Phase 2 – process primary data collection to get an outcome

My purpose being to process this primary data collection to find out the most common sources of phishing and express my findings in an evaluatory report which outlines a management strategy (my form of answer).



Example – Study Project Set Up

Problem Theme: illegal downloads using up resources and increasing security risk

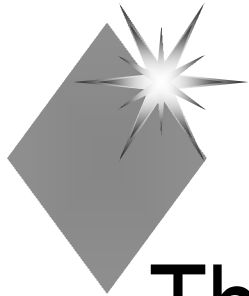
Target: improved worker productivity, efficient use of bandwidth and reduced infection risk

Speculation – here I might say the causes are to do with poor training, poor security, user ignorance of the dangers. no policy etc. But I settle on the lack of a policy.

Research Question: How can (interrogative) illegal download (problem) be prevented or reduced in order to improved worker productivity, gain an efficient use of bandwidth and a reduced infection risk (target) by an analysis of computer user Behaviors (data spotlight) by generating a security policy (suggestion).

With “How” we might expect an explanation answer and in this case it is expressed as a policy document because that limits and controls download behaviours.

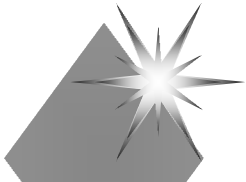
Project Outcome: a security policy aimed at this activity because I think that it will generate the targets stated above.



The Research Process – an Analogy

Phase 1 is like working with a shopping list to collect a bag of ingredients (collection of the primary data) and phase 2 is like using a recipe for Combining them to make a cake (your intended outcome).

To reverse the analogy, if you were going to make a cake you would not just walk into a shop, just pick up a random set of ingredients and then mix them all together into some muddle and expect a cake to emerge - no one but an idiot would do that would they?



Research Methods

In research, usually we try to do one or more of the following: **understand** something, **explore** something, **describe** something, **explain** something, **improve** something, **build** something or **prove** something.

A Research Method is a model a framework in which you set your research design – this useful because each model will have features that suit what it is you are doing

Common Research Methods

Case Studies

Vignettes

Action Research

Experiments

Quasi-Experiments

Common Research Methods

Surveys

Biographies/History

Grounded Theory

Ethnography

Requirements Gathering

Research Methods Selection

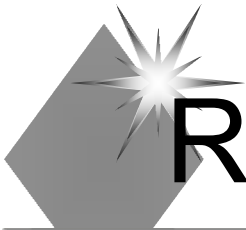
Choosing a method will depend on many factors such as: context, time available, skill available, practicalities, access, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on.

The simplest guide is to think about your basic intension – ask am I setting out to: **understand**, **explore**, **describe**, **explain**, **improve**, **build** or **prove**.

Common Research Methods

Case Studies	- understand
Vignettes	- explain
Action Research	- improve
Experiments	- prove
Surveys	- describe
Grounded Theory	- explore





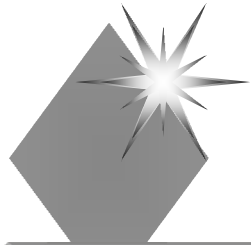
Research Method Example

Suppose my Research was about looking at the trust worthiness of computer users in a situation where personal data is being handled such as Youth courts.

Here we are trying to **explore** trustworthiness and the scale is large and the data is very sensitive in terms of accuracy, potential loss or improper disclosure.

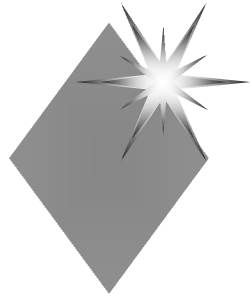
I decide therefore that I need and **exploratory** study here just to try to identify key Points and idea. This make me think of **Vignettes**.

Vignettes are like tiny case studies that just illustrate ONE important point at a time so a collection of these would indicate several important points in trustworthiness and those points could then form the basis for a more extensive study or to initiate debate about the problem theme.



Vignettes Outline

1. Vignettes are used where actions, motives and judgements are to be explored often in sensitive situations.
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Useful when the research question starts with 'how' or 'why' and there is a desire explore and describe some activity or phenomena.
5. You cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept.



Data Collection Protocol

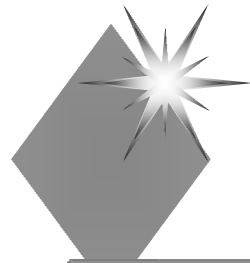
It is very easy to become confused between a Research Method and a Data Collection Protocol.

What is the difference between a survey and a questionnaire?

A Research Method is a framework that surrounds the whole research design

A Data Collection Protocol is a process for actually collecting the defined data from appropriate sample points

Possible Protocols - interview, questionnaire, observation, role playing, seminars, focus groups, document searching and so on

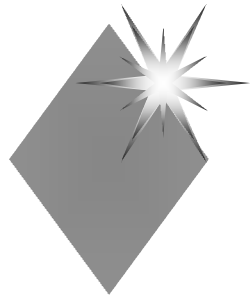


Data Collection Protocol

Vehicle – the mechanism employed by the researcher: interview, questionnaire, observation, role playing, seminar, focus groups, etc

Recording Profile – data will be recording: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria – a profile used by the researcher to identify a valid sample point from which data is collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. Without a profile we may not have any consistency in our data and it may therefore be meaningless.

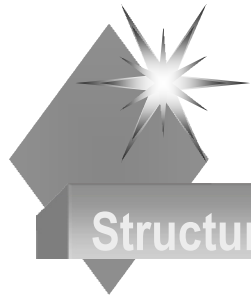


Data Collection Protocol

Location – this is just a definition of where or from whom you will get the data

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable.



Research Design

Structure – it has two phases: data collection and data processing

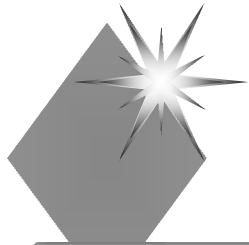
Purpose – it has ONE purpose and that is to generate the intended project outcome by using the collected primary data. If it does not do this it is effectively worthless

Means – the Research Design achieves its purpose by defining two essential processes: a process to collect the primary data and a process to transform the primary data into the intended outcome.

An Input/output process

Primary Data → Use Research Design → Outcome

Objects – we need a collection of primary data and also one often uses other secondary data and technical sources to deal with both these processes



Phase 1 – Core Idea

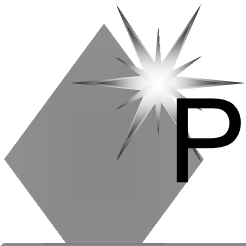
Recall – my problem was unsuitable download behaviours, my target is worker productivity and my outcome is a policy document.

BAGeD: This means **B**asic **A**ctivity for **G**eneration **D**ata. It is the core of the Primary Data collection phase and effectively points to the data you need.

Think of the BAGeD as something like a spotlight that you turn on so that only the data that you need is illuminated.

Suppose my BAGeD is based on **describing** (basic activity) unsuitable user behaviours (the data spotlight) with regard to the internet and downloads.

Do not get confused here the BAGeD is about describing the data it is not about where the data is or how it might be collected



Phase 1 – Complete Process

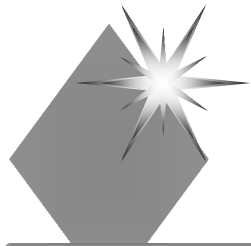
I prepare by making a list (e.g. from journals or books) of what I regard as unsuitable download behaviours which I use to guide me as I interview staff about what they do on the internet. Every time I hear about a bad behaviour I make a note so I end up with a collection of bad behaviour incidents descriptions all embedded in my transcripts.

Now some of these incidents will be the ones on my initial list, some will be ones that I never thought of and some on my list may actually never occur - that is why I have to do the interview to get that data collection.

At the end of this first processing phase I have a collection of primary data in the form download behaviour incident description extracted from in transcripts

Now that I have a processing plan I go through the all the steps:

Define the data (BAGeD), Protocol, Locate the data and lastly Collect the data



Phase 2 – Pre-Processing

In this study I have my data embedded in interview transcripts so to be efficient I must extract my essential Primary Data from the transcripts

Thinking – before I define my pre-processing I think a lot about what I want as an outcome to make sure that the data set that goes into the last phase is in a suitable form

Pre-Processing – I use my list of bad behaviours definitions and I go through each transcript extracting distinct behaviour incident descriptions to which I attach a name. I present this primary data collection as a catalogue expressed as a matrix of incident names, a short description, location and original user type.

Intension – to get a well-structured primary data collection that is in a form that is useful to me in generating my intended outcome

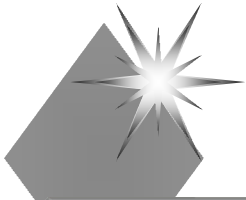


Phase 2 – Process the Collection of Data

My second phase of processing is to take the collection of Primary Data and transform it into a policy which was my expected form of outcome

Process – Using the incident catalogue I derive a **policy statement that would prevent or at least put limits on download behaviours.**

Implicit in this last phase is that I have the understanding and skill to construct a policy. If I did not then it would be necessary for me to gain the necessary knowledge and skill before attempting that part of the research design.



Phase 2 – Process Skill

Example - the University has a policy on assessment and that controls and limits what departments may do. A policy is most often accompanied by a strategy to deal with various aspects of the policy.

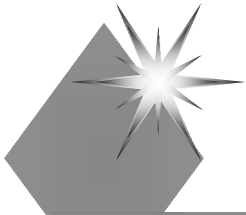
Policy - an expression of a prudent mechanism for controlling or limiting actions based on an underlying ethic as expressed in the mission. Structure: PLOT

P - Principles that are based on organisational values or on legislative or contractual elements

L - Links to other policies or documentary sources. If you are not careful you will find yourself overwriting or changing other policies instead of referring to them.

O - Definitions of the objects to be controlled

T - Track or monitoring elements that set limits on what is permissible. This element will form the bulk of the policy definitions



Phase 2 – Process Skill

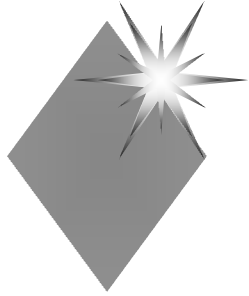
Therefore the construction process for the download policy is:

(P) Set out the principles involved (eg. limiting access, etc)

(L) Make sure you are aware of any other related or relevant policies, legislative or contractual elements or standard formats (eg. Security policy, etc)

(O) Defining the object to be controlled (e.g the Internet, software resources, etc)

(T) Set up how they are to be tracked and monitored (eg. Software audit, etc)



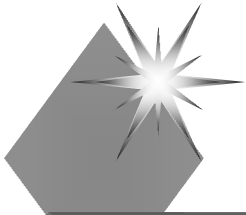
Comments on Exploration

Choose just ONE significant problem and ONE outcome.

Be careful with Scope and Scale (setting limits on your work):

Scope – this means selection or choice. For example, here I might choose to only implement Call Tracking. The point is I set my scope by being selective.

Scale – the means number or extent. For example if I set my scope as looking at Call Tracking I now need to set the number of types of call I will include in my study.



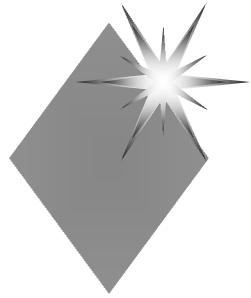
Common Errors in the Aim

Poor English – this often makes it near impossible to work out what the student is saying.

Confusion over Outcome and Target – the core element in the aim is the project outcome but it can also contain the target but it must be clear from the way one writes the aim what the outcome is and what the target is.

Operational Outcome – it is very common to see students focusing entirely on the target and omitting the outcome - such as “To generate improved accuracy in data entry to system XYZ” - no outcome and instead we only have the target.

Multiple Activities and Outcomes - there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just ONE clear outcome for the aim.



Constructing an Aim



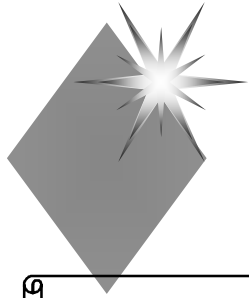
Target – what is to be achieved in the real world

Activity – what are you going to do to achieve the aim?

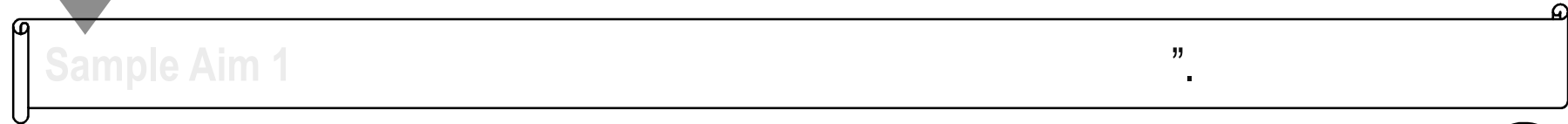
Outcome – what project outcome is wanted?

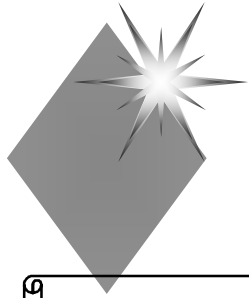
Example Aim – to create a website structure design using cascading style sheets in order that it might be used in design to improve web site accessibility.

Activity = create, **Spotlight** = cascading style sheets, **Target** = to improve accessibility, **Outcome** = web site structure design.

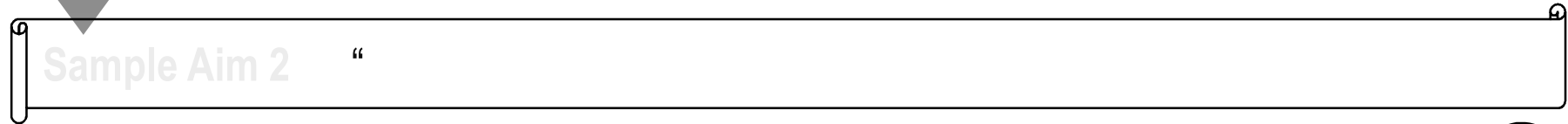


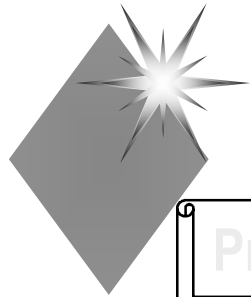
Sample Aim 1





Sample Aim 2





Features of Objectives

Progressive

Activity

Spotlight

Outcome

Bounded

Example

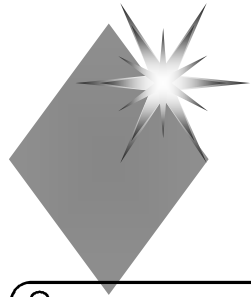
Activity

Spotlight

Outcome

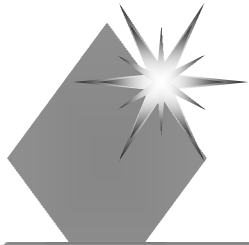
Bounded

progression



Aim/Objectives - Checks & Balances

Can Justify
Can Observe
Can Build



Objective Examples

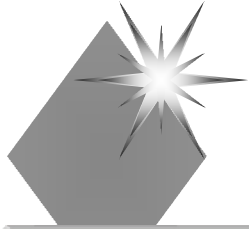
Aim = To report on how the bicycle is an aid to mobility in a modern urban environment

Sample Objective 1 – “To list in a report the components of a modern bicycle”.

This is fine and clearly it is something that you in a project document could do and Somebody else could check it.

Sample Objective 2 – “To describe how a bicycle functions”.

This is no good since although it is clear that you can develop a description no one can check it. Better to say “To describe by means of annotated diagrams how a bicycle functions”



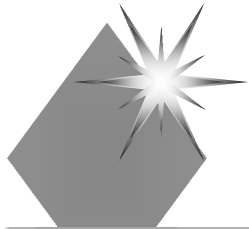
Objective Examples

Sample Objective 3 – “To understand how a bicycle helps urban workers”.

This is no good because although you can do it no one else can check it. Better to say “To prepare a report explaining how urban workers could be helped by use of the bicycle”

Sample Objective 4 – “To ensure that workers get to their office in time by using a bicycle”.

This is no good because you cannot do that and if you cannot do it no one can check it. Better to say “To report on bicycle usage strategies that might be applied by urban workers to ensure they get to work on time”.



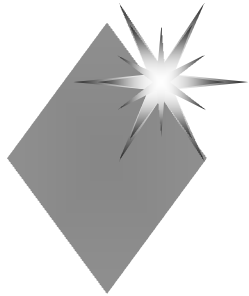
Objective Examples

Sample Objective 5 – “To implement a bicycle repair system”

This is no good since you can clearly do it but it cannot be checked in your project document. Better to say “Report on the implementation of a bicycle repair system” or “Produce a design document for the creation of a bicycle repair centre”

Sample Objective 6 – “To ensure that bicycles conform to BS 7898”.

This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written “To prepare a report showing how a bicycle can be evaluated for BS 7898 compliance”.



Literature Review

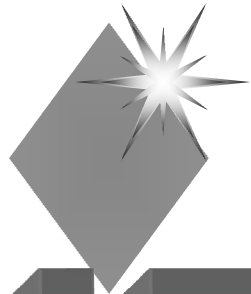
Literature Review – this is where one prepares the mind with all the necessary project area knowledge, understanding and skills. (see WB section 5.7.2)

1. List – the various topic strands that have to be learned

2. Arrange – topic list into a logical and progressive order

3. Theme – decide on a theme to link topic strands

4. References & Bibliography – use Harvard APA for this



Literature Review Structure



1. Focused – on your topic area and nothing else



2. Relevant – topic area is large so only look for what you need



3. Authored – the review must be your work



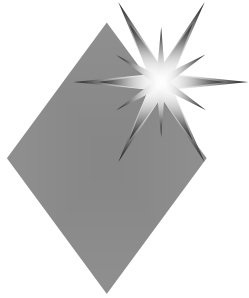
4. Measured – this is about careful section of what you use



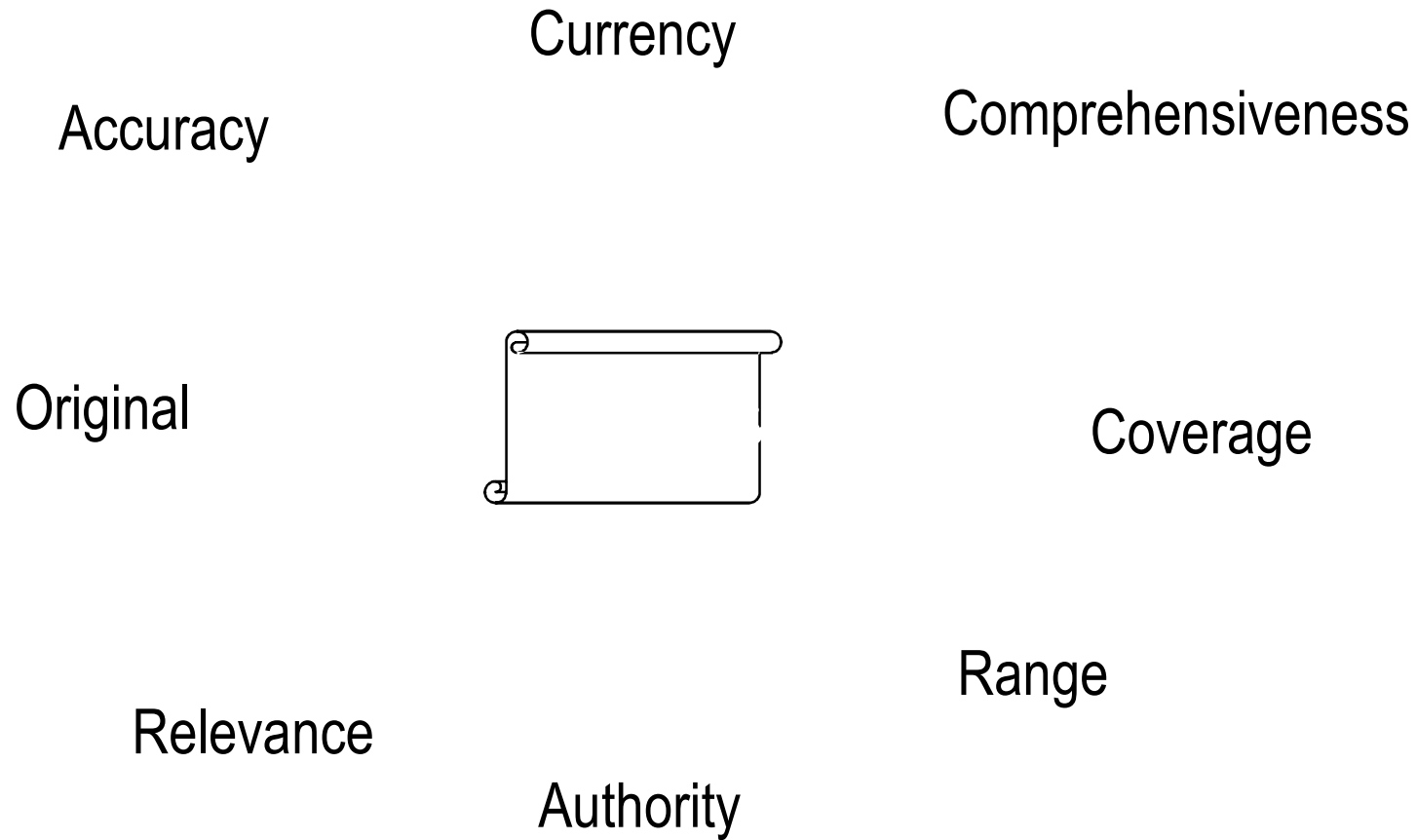
5. Evaluatory – this must be your main work

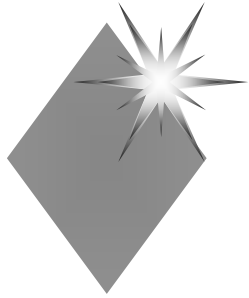


6. Dialogue – you are trying to communicate with the reader



Testing a source



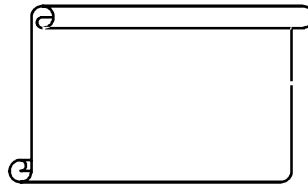


Using a source

Find

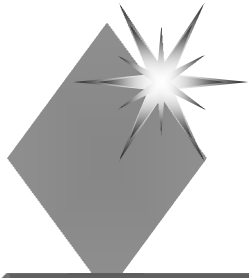
Discuss

Evaluate



Cite

Contextualise



Literature and Integrity

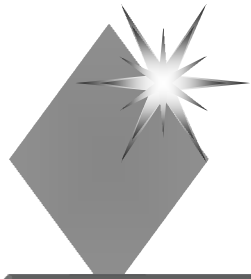
Honesty in research is central if we are to be heard with any degree of authority and gain trust in both oneself and one's work

Plagiarism - is intentionally concealing another person's work in your own. This concealment may occur in many forms – the most common being:

Copy – when done without using quotation marks and the source is not cited

Paraphrase – when done without citing the source

Summary – when done without citing the source



Structure in Reading/Writing

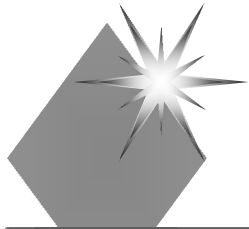
Reading has four features and it is essential that these are understood if we are to read usefully and selectively

Stage 1: Understanding – taken to mean UNDERSTAND THE WORDS

Stage 2: Interpretation – implies that we FIND MEANING in the words used

Stage 3: Evaluation – implies that we ask DOES THE MEANING HAVE ANY VALUE

Stage 4: Contextualization – implies all we read is COLOURED by what we already know. That is we must fit anything new we find into our personal knowledge pool and that may mean throwing out some things as well



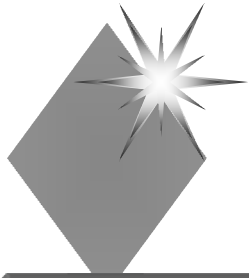
Usage Example 1

What is wrong with the following use of source material in written text

Lyau & Pucel (1995) found a link between training and productivity for their sample of Taiwanese car part manufacturers. Bartel (1994) found that training is a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors. Bishop (1994) and Barron, Black & Lowenstein (1989) both found that training increases management estimates of productivity

This is poor because the reader is only told what the authors said – there is no introduction and no discussion of what was quoted. Even then it is only stating the obvious – it is not the writers work at all!

We might have written - Many authors (Lyau & Pucel 1995, Bartel, 1994, Barron, Black and Lowenstein 1989) found a link between training and productivity and that training is often a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors.

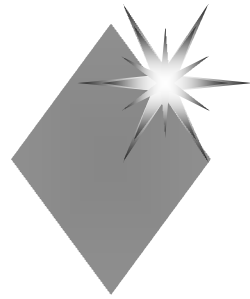


Usage Example 2

What is wrong with the following use of source material in the written text

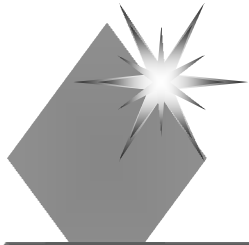
It has been found that because Arabic words were written by copyists who did not use vowels, over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that something in the paragraph is attributed to Noldeke - but a reader does not know what that might be. Similarly, a reader can have no idea which part of the paragraph was written by the author of the text or maybe none of it was and it's a paraphrase. This is very bad practice and some tutors even regard it as blatant plagiarism.



Correct Usage Example

There is a long standing problems with early Arabic manuscripts in that the meaning of many words has become obscure and even in places where the context is strong their meaning is still unclear [my introduction]. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowels, over time the meaning of some words has been lost [a paraphrase]. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding the meaning of some words [my discussion]. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use “assonance or word ending analysis” [a direct quote] to study words and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes [my discussion again].



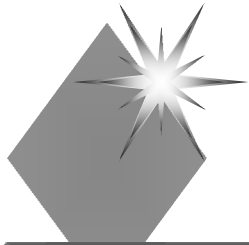
Usage Example 3

What is wrong with the following use of source material in the written text

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that “change in organisations is an inevitable consequence of growth” – this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdal is clearly obvious and that by Briggs is common knowledge. The point is that using citations here is unnecessary and therefore worthless.

We might have written - It is obvious change in organisations is an inevitable consequence of growth and in the modern world that must imply continuous IT progression and updating. Many authors, notably St Clair-Tisdall and Briggs have commented on how these naturally progressive elements may be factored into a company sales policy and



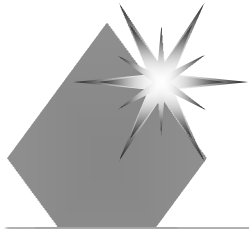
Usage Example 4

Explain what the following section found in student work means

It is argued that tacitness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

If we cannot understand what it is you are saying, then we cannot give you any marks. The sentences are obviously copied, no student would write with such obscure academic complexity – this is not designed to communicate, it is designed to impress other academics.

We might have written – Fahey in his 1989 monograph has stated what should be obvious but he nevertheless less shows conclusively that companies often do not realise that some skills are very difficult to duplicate and this may mean that growth may be restricted or if you like it's not all that easy to copy a skill.



Literature Usage

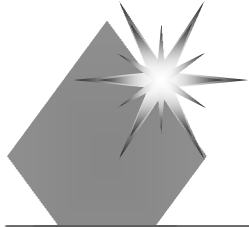
Only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation

Common Knowledge: ... Briggs (1999, p23) said that OO is now routinely used in the computing industry

Common knowledge - many people know it and the information does not belong to anyone person but it cannot normally be deduced by you it has to be learned.

Obvious Observation: ... St. Clair-Tisdall (1994, p45) said that change in organisations is an inevitable consequence of growth

Obvious – many people know it and the information does not belong to anyone person but it can be deduced. It is probably talked about in several sources



Literature Usage

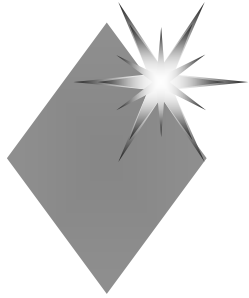
The literature is used to supplement your work, demonstrate your mastery of the topic area and lend authority to what you are saying by building on and learning from other people's ideas.

Mastery of the topic area does not mean you quote, paraphrase or summarise everything you see or know

knowledgeable

argument is essential

deep respect



Project Supervision

Monitor Progress on a weekly basis

Advise on methods and matters of fact

Discuss any and all project elements

Read and comment on finished sections

Pose Questions regarding the student's work

advise



Some Questions

If students get good marks and pass who should be praised?

If students get poor marks and fail who should be blamed?

If a student can recite what they have learned: are they knowledgeable?

If a student gets 100% do they know almost everything?

If a student gets 0% do they know nothing?

What is the function of criticism/feedback on student work?

Learning is about your Thinking, Questioning & Practicing



What is knowledge?

How do you know when anyone has knowledge?

Knowledge may be simple (recall) or tacit (skill)

He/she can **reproduce** it for you to see

He/she can **apply** it in a given situation (problem solving)

He/she can make **generalizations** from it

He/she can **generate** new knowledge from it

He/she knows knowledge is new, **added** to, **modified** or **discarded**.

He/she welcomes **criticism** and regards it as essential to learning



An Example

Primary Data Definition - is new data in the sense that it will not exist as a collection until you define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme.

Exercise - Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them – is that primary data and is this a valid research purpose?





How can we know we understand

All real knowledge is essentially tacit (a skill)

One can only demonstrate knowledge by using it not reciting it



Critical Thinking

Much of our thinking, left to itself, is biased, distorted, partial, uninformed or down-right prejudiced. Yet the quality of our life and that of what we produce, make, or build depends precisely on the quality of our thought.

Shoddy thinking is costly, both in money and in quality of life.

Excellence in thought, however, must be systematically cultivated.

A Definition - Critical thinking is a process by which the thinker improves the quality of his or her thinking by skilfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them.

The Result - A well cultivated critical thinker



Weltanschauung

Your personal world view is rough translation?

It also has a hint of the idea of motive – why we do or think something?

Suppose I have a problem of poor student work – speculate about possible causes and ask why you selected that cause?



Weltanschauung

why you think as you do

Your culture and upbringing?

Your religion or politics?

The particular viewpoint you take?

Influence of your teachers?

Influences of what you read and hear?

Ignorance?



Thinking Barrier - Culture

Culture – this can get in the way because it tends to have norms

Western – characterized by the notion of free speech and openness so I feel free to be critical of myself, my wife, religion, politics, the weather, the Vicar, the prime minister, the Bible, the Qu'ran, the Gita, etc.

Rationale – A society or an individual that limits such freedoms is ultimately self-destructive because it's as if there is nothing new to learn, nothing can be reinterpreted, nothing can be enhanced, nothing discarded as no longer valid and so no new thoughts and ideas are possible.

Eastern & Asian – characterized by a relatively closed society with a huge concern for what is right and a sense of uneasiness about criticism of almost anything but personal things in particular.

Rationale – society should be ordered, there is always a right way of doing things and respect is a dominant quality.



Culture – What can we do about it?

Nothing since it almost totally defines who we are

Awareness – we cannot and mostly do not want to get rid of our culture but we can become aware of it and how it influences and dictates the way we think and act and in that way it can become as a moderator for us.

Arrogance – sometimes our cultural heritage can make us arrogant so we will NOT accept that we might be wrong – so we stop listening and instead we keep repeating what we have already been told might not be right in some arrogant hope that someone will eventually comfort us by saying we were right



Thinking Barriers - Ignorance

Reading – we often do not read widely and sometimes not at all. This means our mind is not being continually stimulated.

Challenge – when we read widely our minds are challenged by new ideas

Argument – reading builds up our knowledge and makes us rational

Discussion – idea can be used in discussion and communication

Possibilities – reading opens our minds to new ideas and old ones

Pleasure – the process is pleasurable in itself



What a Critical Thinker Does

Problems - formulating them clearly and precisely as a starting point

Open Minded - thinks about alternative systems of thought, recognizing and assessing their underlying assumptions, implications, and practical consequences

Form of Answer - what sort of answer is one looking for to given questions

Criticism – accepts and actively seeks criticism as essential to his work

Data - Gathers/assess relevant information, using abstract ideas to interpret it

Processing - comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards

Communicates - with others looking for solutions to complex problems



What a Critical Thinking Is/Needs

What it is

Self-directed

Self-directed

Self-monitored

Self-corrected

What it requires

Excellence

Communication

Problem Solving

Not Egocentric

Not Sociocentric



Some Exercises

Try to form a definition of the term problem itself?

How many ways can to define to solve problems?

How is your problem solving ability affected by your weltanschauung?



What is a problem?

[Bryant 1989] problems are situations where circumstances confound action and doubt clouds decision

[Reitman 1965] proposed a categorisation of problems based on how well one could specify each of two terminal states.

[Simon 1985] proposed that a human being is confronted with a problem when he has accepted a task but does not know how to carry it out.

[Checkland 1989] a problem is a matter of concern or debate among situation actors

[Mayer 1983] a problem is a differences in two states and one wants to get from one state to the other.



Only 5 ways?

Trial and Error (T) - the process is akin to guessing and chance is at work and therefore problem solving may or may not take place.

Top Down (D) - the classical idea of divide and conquer - a complex problem is resolved into smaller and therefore simpler problems.

Generic Solutions (G) - using previous experience. This is a productive mechanism since we ask have we seen something like this before.

View Points (V) - if we have a clear idea of what view we have then we change our viewpoint so that we see the same problem in another light.

Relationships (R) - we consider how elements affect and are affected by other elements. This tends to be the deepest level of solution.



Two Application Methods

You can apply the strategies in sequence: $[T, G]$ meaning do T then afterwards do G

You can apply the strategies in parallel: $\{T, G\}$ meaning do T and G at the same time

You can do all this on your own or with other people



What is going on here?

Think of teaching a programming language as a problem. We could adopt either strategy a and b – now say what problem solving technique or techniques is being used in each one putting yourself first as the teacher and then as the student (what does it look like from a given perspective)

a. Teach in detail appropriate language constructs and gradually show how complete programs might be built.

b. Discuss whole programs and how program elements hang together, learning appropriate language constructs as they are needed.



What is going on here?

Brainstorming a problem is the recording of the rapid and free expression of thoughts about the problem and possible solutions. Brainstorming is carried out in three phases.

Generate - ideas at random and in quick succession for a set period of time

Group - examine all the generated ideas and put them into a number of suitable categories or themes

Grade - finally the ideas are evaluated and ranked in order of importance in relation to the problem setting.

Examine this structure and see if you can write it down using a combination of the 5 strategies (T,D,G,V and R)



Learning – What is it?

Think about the following two questions:

1. What is the colour of your shirt?

2. Describe why this course will fit you for work in the modern computer industry or in business IT

Analysis

Synthesis

Evaluation



Learning – Can I do it?

Memorizing?

Understanding?

Reflection (Ijtihad or Taqlid)?

Problem Solving?

Finding Meaning?

Contextualization?



Two Ideas Poles Apart

Ijtihad – this means something like the idea of critical reflection in English but it has the added nuance of the idea of struggle (from the root jihad).

Why a Struggle – not so much because we might learn **new things** but those new things might mean you may have to **modify** what you thought was solid, you may have to find a **new interpretation**, and you may have to **throw away** altogether some things and start again – if you think about that for a minute you will realize there is considerable struggle implied.



Two Ideas Poles Apart

Taqlid - this means something like blind unquestioning obedience to what you have been taught – it's as if nothing at all can be added either as ideas or interpretation.

In practice all we would be doing if we take this view is simply regurgitating what others have said and using the same methods over and over again and never moving forward. It's as if the idea of new knowledge itself has been discontinued, that we already know all there is to know.



How to Think

The prophet Mohammed in a Hadith is reported to have been asked the following question:

Question: Is it permitted to have doubts?

Answer:

Creative Doubt

Ask Questions

Discuss

Self-critical

Challenge

Reflection (Ijtihad)

Honesty



Skills Allied to Thinking

Read

Write

Speak

Listen



Thinking means Questioning

Bi-polar Questions – those with a limited range of answers

Is it possible to sharpen this pencil? (Y/N)

What is the correct pencil weight for drawing a picture? (HB1, HB2 etc)



Thinking means Questioning

Open Questions – give liberty to provide various forms of answer

Explanation: question expects an answer as a process/procedure

How can a pencil be sharpened safely by young children?

Description: answer expressed as a description or an evaluation

What is the purpose of HB0 pencils? (simple description)

Why are HB0 pencils difficult to sharpen? (an evaluation)

Exploration: answer in the form of a discussion

How should we use HB1 pencils best in drawing figures? (often an exploration is needed here leading to an explanation)



Dogma – what is it?

This simply means things you have to take at face value. Most often dogma is presented in such a way that one is not allowed to question it.

Dogma = The Truth

Religious Dogma – about heaven, hell, sin, what you can wear, eat, etc

Political Dogma – what is best for you, what is best for the country etc

Market Dogma – globalization, economics, trade, free markets, etc

Academic Dogma – theories, methods, tools, ideas etc



What is Thinking?

Some words from the Bible – Jesus said “If what you see causes you to sin, tear your eyes out and fling them away”

1. Can you understand these words?

2. If you can understand them what do they mean?

Ibn Rushd said - if the literal meaning of the words is clear but don't make sense the writer must have meant something else so we must find the meaning of the words



Dogma – what is its effect?

It tends to stop you thinking and questioning

Question – be honest with yourself and think about what you do when you see, hear or read something which is at odds with what you know or believe be it religious, political, academic or whatever?

The trouble with dogma is that it tends to make your rational mind BLIND

When a blind rationality sees, hears or reads something which is at odds with what it knows or believe the reaction is not to ask what does it mean BUT to blindly say it must be **wrong**

The Data is Wrong – students often come to me and say my data is wrong. What they mean is it gives them an answer that they don't like.



Dogma – what can we do?

Is Dogma therefore good, bad or neutral?

Can we stop people believing in something?

Learn to react in a listening manner so think for yourself

Learn to rationally question contrary opinion

Ask for and examine the evidence

Learn to be open-minded – accept for what they are other people views

Don't be afraid to disagree – but do it rationally if you can

Be aware of our own bias and prejudice

Accept that what you thought was truth might need to be changed



Dogma – what can we do?

Listen to their teachers (notice it does not say agree with them)

Listen to anyone (notice it does not say agree with them)

Aware of ones own bias and prejudice

Discuss freely without rancor

Appreciate other points of view

Be aware of the influence of ones own culture



A Student's Duty

To continually ask questions of their teachers

To continually ask questions about what one reads, sees or hears

To challenge their teachers ideas and opinions

To stop thinking that always there is a right answer

To believe that there may be best answers

To question what your own thinking

To welcome criticism and not to look always for praise



An Anecdote

Good teachers are not enough YOU must find the best way for YOU to learn.

Imam Al-Ghazali went to University in Gurgan. He studied there for 4 years covering several subjects – indeed everything that could be learned there.

On his way back his caravan was attacked by Bedouins who took everything including all his course notes which were in a leather bag.

He begged the Bedouin chief to give him the notes as they were no use to anybody but him and in any case the Bedouin could neither read nor write.

The Bedouin then threw the bag of notes at Al-Ghazali and said “I thought you went to University to learn, not to take notes”!

Al-Ghazali was so struck by this idea that he went back to Gurgan for 4 more years, took no notes but thought a great deal and became one of the foremost scholars of his age or perhaps any age.



What Tutors do

When asked a question try to avoid giving the answer directly

Answer a question by asking another question

Answer a question by asking students to do something

Answer a question by offering several answers

Answer a question by discussing its context



Challenging Students

Answer a question by asking them to **guess** the answer

Answer a question by asking if they can find a **simplification**

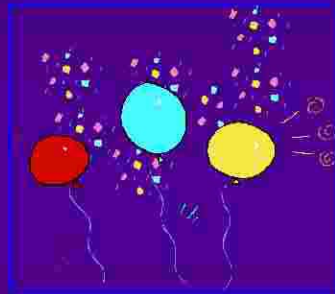
Answer a question by asking if they have seen a **similar** problem before

Answer a question by asking if they can find a different **view** of the problem

Answer a question by asking if they can find any **links** within the problem

Eventually the students will do all of the above to themselves

What is a Learning Community?





Summary of what we will do

Define – Problem and associated target

Research Question – at a minimum linking problem and target

Outcome – the object to be generated: model, report, theory, a matrix,...

Aim – to link outcome and target

Objectives – a set of activities that generate minor project outcomes

Research Design Part 1 – define the data and state how it is to be collected

Research Design Part 2 – process the collected primary data to get the outcome



Basic Research Structure

Topic Area – this just define the general area in which you are working this is a simple step and although part of the process is not a key elements in focusing

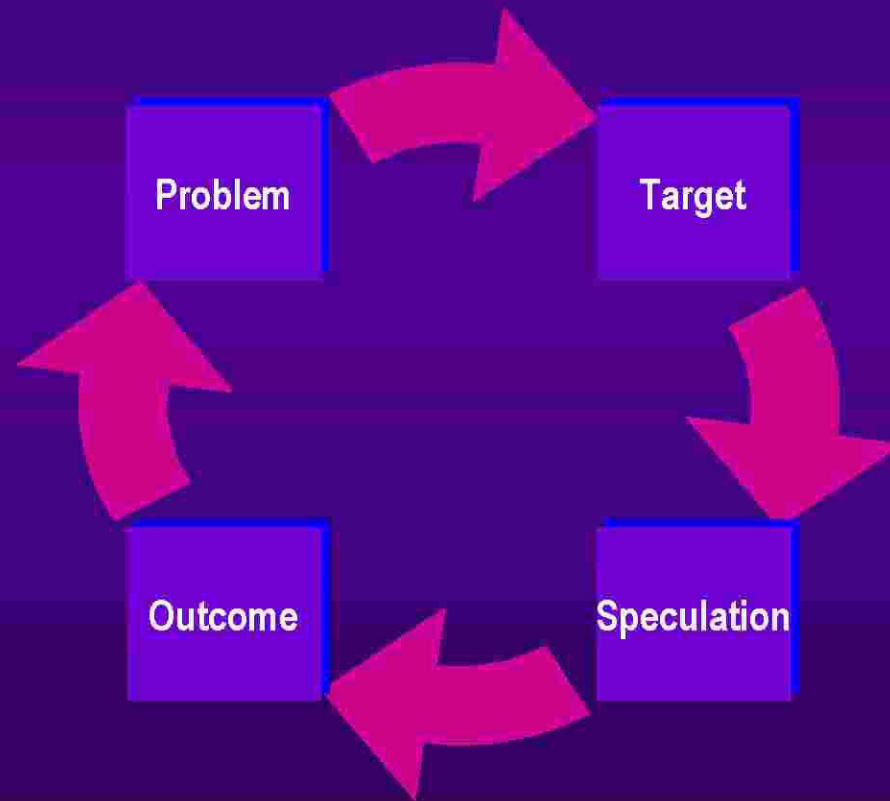
Problem – define a single significant problem

Target – say what real-world effects will be produced if we can solve the problem

Outcome – what is it that you can produce that will generate the target effects



Cyclic Research Structure





An Important Distinction

Problem - is something that is a matter of concern or debate in a given situation

Target – this is the real-world effect that you want to produce. It might be things like: improved network infrastructure, strategic Technology alignment, reduce network down time, a heightened awareness of security etc. (VERBS)

Outcome – this is what you produce as part of your project, dissertation or thesis. As we have seen the idea is that we can use this outcome to generate the target effects. Possible outcomes are: a model, an explanation of some behavior, a usage protocol, a feasibility report, a post implementation review etc (Nouns)

Features of an outcome - when you name your outcome ask: can I write it down, is it easily observable, can it be placed in a document, can it be sent to Portsmouth for marking. If it is any or all of these its probably an outcome



Can I define a problem?

Example 1 - My problem is to find a way to implement a new network infrastructure”

I might reword this as “my problem is to find an answer” – I think you will agree that such a formulation is worthless.”

It is better to start off with a problem idea such as **uncertainties** associated with the technology needed for the proposed new network infrastructure.

Example 2 - My problem is lack of IT training in the help desk staff

This is hopeless because in fact it is a solution not a problem. It is obvious that if the problem is lack of training the solution is to give training so for all practical purposes that sort of formulation is worthless

Much better to say, in this case, that the problem is complaints about help desk operation from customers.



Example 3 - My problem is to decide if a training policy can be constructed to deal with the data entry errors in our CRM system

Its so obvious really that you may miss it – “decide can be ..” well of course this CAN be done so its not much of a problem is it if we already know the answer. In effect the student is saying his problem is to know if there is solution.

The problem is **data entry** errors and that is what needs to be analyzed



Here are the most common faults we see when we look at problem definitions

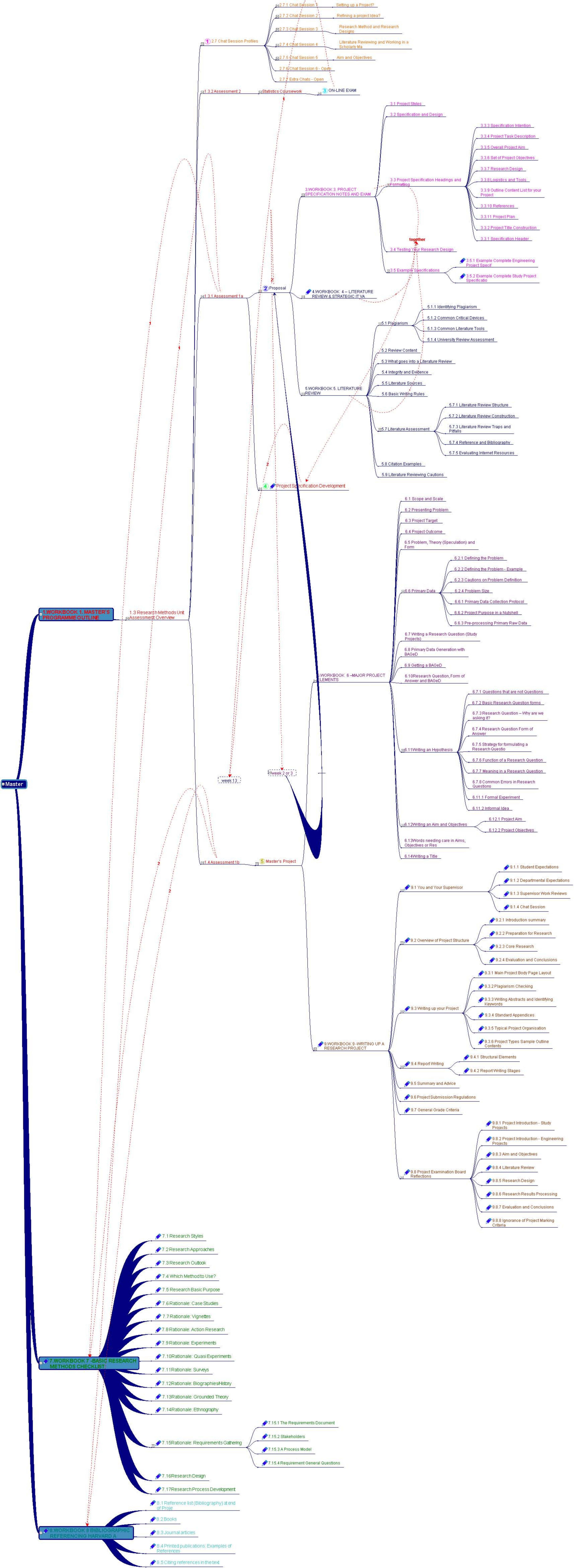
- Listing **many problems**,
- Stating the problem as **something to do**,
- Stating the problem as being **something is missing**
- Stating a **solution** not a problem,
- Stating the **problem is the problem**
- Trivial** problems,
- Non strategic** business IT problems,
- Not stating a problem at all.**



Can you make the Distinction

1. A strategy
2. Increased productivity
3. Better fit with technology
4. A best Practice Model
5. Improved sales
6. A security policy
7. Highly usable systems
8. Efficient network control
9. A pattern of work
10. A process flow
11. Simpler Web Page Access
12. A role description
13. Better trained operators
14. A list

15. A theory
16. A feasibility report
17. A computerised sales program
18. A post implementation review
19. A predicative report
20. A process description
21. A model or framework description
22. Improve IT management
23. A definition or set of definitions
24. A comparison matrix
25. A design
26. A methodology
27. A security protocol
28. Secure passwords





Student Workbook Pack

Research Methods for Master's Students

School of Computing

CN.002 Release 3.2c December 2006 ©

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1. WORKBOOK 1. MASTER'S PROGRAMME OUTLINE

The Master's programme has two units of study: Research Methods and Project and the online programme notes together with this workbook pack cover all the information you need to complete it.

1.1 University Expectation

The University expects that when students submit work it is the very best they can do. In practice this will mean several things and all of them will be examined when work is assessed.

English – written English must be of a Master's standard and that means an IELTS score of at least 6.6 (or equivalent) is needed. If submitted written work is judged to be below this standard, students will NOT be allowed to progress to the project stage no matter what their actual language certification states.

Structure – work must be well structured and coherent. In practice students will most often work with a pre-defined set of headings and they must be used explicitly without deviation in their implied content.

Preparation – good work can only be produced if there has been adequate preparation. This will mean a thorough study of any and all references and exercises. Study does not mean a quick read through the notes or academic arrogance which says "I don't need it" or "I know all this stuff". This preparation also means working through the topic idea itself so that one becomes expert in a particular field.

Instructions and Guidance – all the work you submit will have to meet various standards in terms of layout and format and students are expected to following such guidance diligently.

Using other people work – all work submitted must be the student's own but within that work they may refer to the work of others but all material used must have proper attribution. Thus, if another author's work is copied, paraphrased or summarised it must be properly cited. Students need to understand that paraphrasing (putting things in your own words) and summarisation will amount to plagiarism if not properly attributed. This is a very serious matter and the rule with regard to copying is very simple. If 6 or more words are copied then the sources must be cited and if 10 or more words are copied without attribution then that is regarded as proof of plagiarism

Student's Own Work – the submitted work must be entirely constructed by the student and to do this it is necessary to weave into ones own ideas and thoughts the work of others. One may use the work of others to lend support to a proposition, or to include a definition or an explanation and so on. In other words it is not so much a question of how much of another person publication one uses but what one does with it in constructing ones own research work. In short scholarship is acknowledging and using the work of others whereas plagiarism is using the work of others and in so doing attempting to fool the reader into thinking it is ones own.

Respect – when writing one is doing it for another person to read and it's therefore a grave sin in those circumstances not to offer the very best one can produce.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying and it is not just common knowledge or obvious. The key task is to formulate ones own ideas, in your own words by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

1.2 Overview of Unit Assessment

The two units: Research Methods and Project are assessed separately and students must in each one gain at least a pass grade in order to qualify for a Master's award. The assessment artefacts are.

Research Methods Unit (15 Credits)

The Research Methods Unit will be taught over approximately 12 weeks and assessment details will be published to you early in the Unit. The assessments are as follows.

Assessment 1a - development of a project specification plus a short literature review

Assessment 2 - a coursework on statistics.

Project Unit (45 Credits)

The Project is an extended research exercise where students will be guided by a personal supervisor. For students who have passed assessment 1a, approved projects will start a few weeks after the end of the Research Methods Unit and last for at least 18 weeks. There is only one assessment as follows:

Assessment 1b – prepare a full research based project document based on the specification developed in assessment 1a. The details of what is required in the Project itself can be found in Workbook 9.

1.3 Research Methods Unit Assessment Overview

This unit of study requires about 150 hours of effort from each student and will cover research principles, research ideas, research techniques as well as statistics. Assessment details and due dates will be made available early in the study period for the Unit in WebCT.

1.3.1 Assessment 1a – Preparation, Literature Review and Project Specification Development

The first unit event will be related to the development of a project specification and is in two stages.

Part 1 – Project Proposal Approval (up to 10 marks) – when the Research Methods unit begins students need to gain approval for a project title/idea. The university will supply a list of ideas or students may bring one of their own as long as the related project outcome has a strategic business IT dimension, it is new work, it involved learning in IT and it is a Master's level activity. In the approval process students have to write a short submission to a set format and send it in a plain email to the Research Methods tutor whose decision is final. This process must be completed by the due date set in the Assessment 1a papers (normally about week 6)

Students are permitted ONE attempt to gain marks in each cohort at this stage and one of three outcomes is possible:

Approved – the submission, whilst not necessarily being perfect, meets all the above project criteria and the outline is judged good enough for the student to begin work on the specification. About two weeks after approval is granted a supervisor will be allocated who may assist you in finalising the project Specification.

Permitted – the submission has a suitable idea but its construction is judged to be of poor quality but the student is given the benefit of the doubt and is expected to make good in the specification. No supervisor will be allocated and final approval will be depended on the quality of the final specification.

Rejected – the work is received after the due date or submission does not meet the criteria for a project in this degree and a new topic must be chosen and a new application made. Most often this is because there is no Strategic Business IT, the project research is regarded as trivial or plagiarism is detected.

Part 2 - Online Self Tests – these will be available at set times for a set duration every week for the first 5 weeks. Typically 1 mark will be awarded for each test in which you score 65% or better. Students should note that missing any test for whatever reason means the recorded score will be set to zero automatically as there is no provision for taking the test at another time or by another method.

Part 3 – Short Literature Review and Specification Approval – based on an approved or permitted project proposal students prepare a short literature review and full project specification which must be posted into a WebCT drop box on or before the assessment due date. The Research Methods tutor will review the work and write a feedback report for each student. The specification and feedback report will then be placed before a University panel who will decide whether it is appropriate for a Master's level project. At the end of the specification approval process one of four outcomes is possible:

Approved – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Approval will not mean that a specification is perfect and it is expected that students will take note of any feedback given by the Research Methods tutor or the allocated supervisor to further refine it.

Approved Conditionally – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report. Conditional Approval means that there are some significant concerns that must be addressed before work begins and students are expected to redraft their specification, based on feedback given by the Research Methods and in discussions with the allocated supervisor.

New Topic – this means that a student specification has been rejected in its entirety and another topic must be chosen and work must begin again by seeking approval for the new topic before writing a new specification for submission in the next available cohort. This action is most often used when the University decides that the work is trivial, or the work has no significant IT content, or the student has submitted a specification without gaining approval for the topic, or plagiarism is identified.

Plagiarism is Identified – no approval is given and the relevant student work is subject to review by a disciplinary panel. Plagiarism is a form of deliberate deception in order to gain advantage and will always be treated with the utmost seriousness and may even result in students being dismissed from the course.

1.3.2 Assessment 2 - Statistics Coursework

This is usually a set of questions and mainly deals with quantitative data. The submission date will be published to you.

1.3.3 Calculation of Research Method Unit Mark

The overall mark for the Research Methods unit will be calculated as a weighted average for assessment 1a and 2 with the actual calculation being $0.7 \times \text{Assessment 1a percentage mark} + 0.3 \times \text{Assessment 2 percentage mark}$ in which a pass is indicated by scoring 40% or more overall.

1.4 Assessment 1b - Master's Project

This unit of study requires about 450 hours of effort, guided by a University appointed supervisor and based on the specification developed earlier in the programme. The actual project document must be supplied in the form shown in section 9 of these notes and is expected to be of about 15,000 words maximum (excluding appendices).

Once allocated a supervisor, students will be asked on what date they wish to submit their project. The only rule regarding project activity is that it must last at least 18 weeks and no more than 2 years but it will be a matter for students to negotiate with their supervisor and the University to agree a submission date. Students are allowed to make small changes to the specification during the project process but they must be approved by the supervisor and must not amount to a change of the topic that was approved.

2. WORKBOOK 2. RESEARCH METHODS CHAT AND STUDY PLANS

This is a general plan for study for this course. Chat sessions are important because they are collective and interactive and typically focus on just one important feature of research and to get the best out of the course students need to prepare properly. That means reading the notes, doing the multi-choice tests that go with each chapter, studying the Workbooks and contributing if you can to the discussion boards.

2.1 Contact Mechanism

Contact with students is through email, discussion boards or chat. Email is very important and you should ensure that you use an Internet based service so that you can get mail almost anywhere. It is good practice to create an email account just for the duration of the course and a common choice is GoogleMail because the storage space is, for all practical purposes, unlimited. If you are not able to create a GoogleMail account let me know and I will send an invitation to you. It is important that only ONE email account is used for communication and that address is made know to the Research Methods tutor as follows.

Whatever, mail system you use it is advisable to set mail forwarding from both your WebCt accounts to your personal one to ensure that you get mail as soon as it available. It is also useful if students have a Skype or IM account as many tutors allow direct access if they are online. Skype is preferred since chat, voice and video are all catered for and during contact one does not get bombarded with advertising. Internet email services vary considerable but my recommendation is that you only use a service that:

- Provides a virtually unlimited storage capacity
- Guaranteed to work from almost any location: hotels, Airport, etc
- Allows you to set a mail forwarding address (most services do not so check this with care)
- Provide quality SPAM filtering, virus checking and is not on the SPEWS blacklist
- Allows POP redirection (so you can use Outlook and send from databases etc)

2.2 List of Workbooks Sections Available

Here is a list of all the workbooks in this pack. Students must read them as the course progresses and tutors will expect a committed familiarity with what they say.

No	Workbook Name	Comments
01	Master's Course Outline	General overview of course and assessment structure
02	Research Methods Chat and Study Plans	Lesson plans for the chat sessions and student study plan
03	Project Specification Notes and Examples	Shows what a submission should look like with some helpful hints
04	Sample Literature Review and comments	Shows what a submission should look like with some helpful hints
05	Literature Reviewing	Guidance on constructing a review
06	Major Project Elements	Notes on writing a clear aim and a set of corresponding objectives
07	Basic Research Methods Checklist	A list of several possible research methods for quick reference
08	Bibliographic Referencing Harvard APA	Notes on how to use and cite source literature
09	Writing Up a Research Project	Sample content outlines on how to write your project document
10	Project Submission Form	A checklist to use before project submission
11	Marking Form Study Format	A copy of the form use to grade your project submission for reference
12	Marking Form Engineering Format	A copy of the form use to grade your project submission for reference
13	Project Mark Reconciliation Form	A copy of the form to reconcile marks when markers cannot agree
14	Supervisor/marker notes and grade criteria	Use by supervisors and markers to assess project work
15	Unit Level Feedback	Form that allows you to give feedback on each unit you study
16	Research Methods Master Notes	Complete course notes as a pdf file (not in this pack)
Table 1. List of Workbooks		

2.3 Complete Study Plan

Students must work in a committed way for the 12 weeks during the Research Methods unit and submit the work required on the set dates – there will be no extensions given other than for sickness or other indisposition (in which case students need to complete an ECF and provide documentary evidence of incapacity). Failure to deliver on time without permission will mean that the student unit result will be recorded as a fail. For the whole course the timings in hours are approximately as follows:

Course Element	Time	Comments
Chat Sessions	25	Including preparation and summarizing the chat log
Regular Visit to Site	25	For email and discussion board
Study Notes/Text Book	35	Including making notes and doing the tests
Preparing Submissions	65	Including reading the relevant workbooks and topic details
Table 2. Overall Research Methods Unit Study Plan		

2.4 Recommended Timings for Completing the Research Methods Work

Please look at the following list of times for preparation and carefully plan a way through this unit using these estimates.

Course Element	Time	Comments
Statistics Questions	20	There will usually be 4 questions for you to work through.
Literature Searching	10	The key to a successful submission of the assessments is that ones mind is fully prepared with all the knowledge needed.
Task Description	5	Here students prepare a project proposal: the research question, the form of answer expected, the Basic Activity for Generating Data, data specification and decision on a research method.
Project Idea Approval	5	The format used for this can be found in the Assessment 1a description
Research Plan	5	Here students prepare a plan for collecting primary data. This is not literature searching, it is new and original research
Short Literature Review and Project Specification	20	A partial short literature review and comment is provided in Workbook 4. The Project Specification format is presented in Workbook 3.
Table 3. Coursework Submission Plan		

2.5 Recommended Five Week Development Plan

In this course students must write a project proposal as soon as possible using the format set out in Assessment 1a. However, the basic project idea must be developed and refined carefully and typically it will be done in the sequence shown in table 4 where items in blue are specific to Engineering and items in red specific to study projects. Typically this refining process start is week 3 of the course

There is NO short cut in this work and the standards are very high. The expectation is that you will read and study the notes, examples and exercises with dedication and care. Failure to study with care is usually obvious in the quality of the work prepared, so work hard and think through carefully all the steps below – there is NO substitute for thinking your own idea through. There are plenty of examples to guide you but these examples are not templates they are there to help you gain understanding and not as some sort of quick fix to the work.

If the University sees in your work that all you have done is copy the example substituting a few words here and there then it is very likely your submission will be rejected. The University is looking for students who are thoughtful and careful in their work and through a process of hard work each student must demonstrate commitment high standards – nothing else is acceptable.

Week	Work Recommended
2	<p>Topic Area Research – this is about thoroughly understanding the topic area in which your problem is set. For example, if one was looking on Inventory Management using IT in a fast moving retail environment. that is where your literature research efforts are to be directed. So one would look at inventory management itself, warehouse based systems, shop shelf systems, POS systems, tracking fast moving but small value items, restocking, forecasting, re-ordering and so on. The idea is that you take time to think of all the aspects of the topic and then you try to become knowledgeable in them. There is no short cut here and the work must be done thoroughly and with commitment.</p>
3	<p>Presenting Problem Definition – every project will be based on a real-world problem of some kind. Student must define the problem as accurately as possible and that will be the theme of this first work element. Notice the intention is to have just ONE problem definition. (See Workbook 6 section 6.2 and 6.5)</p> <p>Target – this is the intention of solving the problem itself – that is what real-world benefits will result. For example, the problem might be about accuracy in inventory records and that would imply that if we can find a suitable project outcome that can be used to alleviate that situation then it will results in the target of for example reduced inventory costs. Problem and target are two side of the same idea. (See Workbook 6 sections 6.3)</p> <p>Research Question – here one tries to encapsulate the problem definition and ones theorising into a concise and lucid question that will form the focus of the research effort. (See Workbook 6 section 6.7 and 6.9).</p> <p>Theorizing based on the problem Theme – here one theorises about possible causes of the problem and corresponding solutions. In the case of inaccurate inventory records we might theorize solutions as being based on: production of a training plan for staff, feasibility report on possible use of technology, development of a sales policy and so on.</p> <p>Project Outcome Form – during theorization choose what might be regarded as a best solution and this becomes the single outcome intended for a project. For example, if we take the problem mentioned above of inaccurate inventory records then a project outcome could be a feasibility report on the use of RFID as this might be seen as a way of solving/partially solving the stated problem. (See Workbook 6 section 6.4 and 6.7)</p>
4	<p>Primary Data Definition Outline – the primary data definition is affected by means of the BAGD and it needs to be focused on the problem definition and the expected form of answer. (See Workbook 6 section 6.6, 6.8 and 6.9) In Engineering projects the outcome will be an application of some kind and that needs to be described.</p>
5	<p>Aim and Objectives – in the aim and objectives you sharply focus ones project by stating the means whereby one gets the major project outcome by a series of minor ones in order to achieve the project real world target. Of particular significance here is that the distinction between a project outcome and a project target is thoroughly understood. (See Workbook 6 section 6.11)</p>
6	<p>Research Design – this is the core of any project and it is the place where one expects to see serious and consistent thinking about how the presenting problem is to be resolved by collecting and processing primary data in order to generate the expected project outcome that will eventually lead to a real-world benefit called the project target. There are three elements as follows. (See Workbook 3 section 3.2, 3.3, 3.4 and either 3.5.1 or 3.5.2 as appropriate)</p> <p>1. Research Method Selection – this is an overarching framework used to guide and control the research effort. There are many Research Methods and it is necessary by a process of logic based on ones Research Question and it primary data needs to select and justify a suitable method. For Engineering projects the research method is focused on collecting application requirements. (See workbook 7)</p> <p>2. Design of Primary Data Collection Plan – based on the Basic Activity for Generating Data which focuses on the core data needed and then that basic activity surrounded by a process that allow reliable collection of the primary data. (See Workbook 3 section 3.5.2). For Engineering projects the plan is based on the outline application proposal which focuses on the core requirements and outlines a process or processes that allow reliable collection of the requirements. (See Workbook 3 section 3.5.1)</p> <p>3. Design Primary Data Processing Plan – with a collection of primary data in some suitable form one can apply some processing to it in order to arrive at the expected project outcome. Typically this might be statistics if the data is quantitative, various forms of text analysis or diagramming if it is qualitative. (See Workbook 3 section 3.5.1 or 3.5.2)</p> <p>For example, if one conducted a survey on the effects of SPAM on personal productivity then this might have been done with a questionnaire with say 20 questions. Now processing each question and drawing charts and graphs is NOT the same as explaining the effects of SPAM on productivity – to do that one must consider the whole survey where each question would be a dimension of the problem space. It follows that typically one pre-processes the data collection in some way and later using the results of that pre-processing we further process the data to get the intended outcome</p>
Table 4. Specification Elements Work Plan	

2.6 Critical Reflection

Students must expect to go back and forth over their work because as knowledge and understanding grows one will inevitably see that some of one's earlier work was incorrect or not as clear as it could be or maybe it can be improved in some way. This revision strategy is very important as a common fault with research work is that it often lacks consistency because there was no serious reflection on earlier work.

2.7 Chat Session Profiles

The following is a simple guide as to what students will be covering in the online chat sessions. These sessions are extremely important as they are usually interactive and are based on using examples. The research Methods Unit will involve a chat session roughly once every week – half these sessions will be based around the notion of research methods and half based on statistical processes.

2.7.1 Chat Session 1 – Setting up a Project?

This chat session will be a discussion of what is meant by research. The chat will focus on the idea of a presenting problem, target and outcome as the basic project building blocks. From this the chat will move to discuss a framework to surround a research project and a look at some of the core techniques that must be mastered. To prepare for this chat read Workbook 1 and 2 and Workbook 6 section 6.2 to 6.6.

2.7.2 Chat Session 2 – Refining a project Idea?

This chat will take the form of a discussion on how a project idea is explored and focused and a full example will be used followed by an open discussion and questions from students.

To prepare for this chat, students should be familiar with the title approval format shown in Assessment 1a and the specification examples and notes shown in Workbook 3 sections 3.5.1 and 3.5.2. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea. Of particular concern in this chat is the notion of presenting problem Workbook 6 section 6.2 and form of answer (project outcome) in Workbook 6 section 6.3 and 6.7, Basic Activity for Generating Data Workbook 6 sections 6.8 and 6.9. Students must work hard on these three ideas if they are to form an acceptable project specification.

2.7.3 Chat Session 3 – Research Method and Research Designs

In this session a research design will be developed based on a personally developed problem definition, research question, form of answer and Basic Activity for Generating Data. To prepare for this chat students should be familiar with the title approval format shown in assessment 1a and have studied the specification examples shown in Workbook 3 sections 3.5.1 and 3.5.2 as well as the associated notes in section 3.1. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea.

2.7.4 Chat Session 4 – Literature Reviewing and Working in a Scholarly Manner

In this session some examples of student work and how they write down their ideas will be examined based on scholarly principles. This will be followed by looking at a process that applies equally to what one writes and what one reads. The remainder of the chat will examine several excerpts from student work that exhibit common faults. To prepare for this chat read workbook 8 on citation styles and bibliography, chapter 4 of the notes and Workbook 5 and it might be useful to read through the sample short Literature Review in Workbook 4. In addition, it will be useful if one look at one's own way of using primary source materials and find some examples that are good and bad.

2.7.5 Chat Session 5 – Aim and Objectives

This chat will focus on how to write an aim and a set of objectives based around a problem definition and a Research Question. To prepare for this session read Workbook 6 sections 6.11 and Workbook 9 section 9.6.3 but also consider one's own project idea and what might be suitable in that case.

2.7.6 Chat Session 6 - Open

This chat will look back over the course and typically review faults that arose out of the assessment of the project specification. This will be supplemented by a discussion as to how various project elements: title, research question and Basic Activity for Generating Data, aim (not aims) and objectives are constructed but focused on the basic Activity for Generating Data.

2.7.7 Extra Chats - Open

Normally, each week there will be an open chat on Sunday at 1400-1500 where students may bring their questions, comments, concerns or grumbles. These are useful sessions but only when students come prepared with items that they need to discuss. These are not teaching sessions so the tutor will have nothing to say unless students come prepared with questions and are willing to participate.

3. WORKBOOK 3. PROJECT SPECIFICATION NOTES AND EXAMPLE

This section contains some guidance notes and sample completed project specifications - please consider them carefully. Do NOT copy them blindly – they are just for guidance and students must write their own in a way that matches what they want to do. The aim of the specification is to state a project plan as clearly as possible so one needs to be concise and precise.

3.1 Project Styles

In projects two styles are commonly found. There are some restrictions on these two forms depending on what programme you are on but the Tutor will advise on that issue. Briefly the two styles are as follows:

Engineering – here you design and build a software application, create a system design etc.

Study – here you design a research program to collect primary data in an attempt to find an answer to an interesting question. For example, one might investigate whether cascading styles sheets lead to simpler accessibility or you might evaluate the role of email management in business success.

3.2 Specification and Design

The following notes and samples for project specifications may help you prepare your own. However, it is important to think of it as being primarily a design for your project. The specification is essentially in three parts although it is not presented in exactly this sequence:

Preparation – this is not explicit in the specification but implies that you have thoroughly reviewed the literature at least to the depth of feeling confident that you know enough about the project topic to define and gather data. Implicitly, the University will look at your use of the literature and reference list to assesses how prepared you are for this work at this level and on this topic.

Background – this is about you setting the scene and defining a problem and then focusing on that problem with a Research Question, aim and a set of objectives.

Research Design – this is the culmination of the specification where you set down your detailed design for defining, collecting and processing primary data to get your stated form of outcome. It is very important to realise that this is a design and without a sound design things are likely to go very wrong.

In summary, one needs to think of the whole processes as starting with a problem definition and ending with a solution (your project outcome) and the element that connects these two things is your research design. It follows that unless you have a good design you will not be able to get from your problem to your outcome and that will mean your project fails.

3.3 Project Specification Headings and Formatting

All the following main headings and subheading must be used and students must not introduce others. As these guidance notes are read it is advisable to also look at the relevant examples in section 3.5 so that one can clearly understand what is being said.

3.3.1 Specification Header

Make sure all your details are entered correctly otherwise work may be misfiled or rejected because we cannot ascertain whose work it is.

3.3.2 Project Title Construction

Project titles must make clear sense in English and not be overlong. See Workbook 6 section 6.13.

3.3.3 Specification Intention

This element is to be a simple statement regarding whether there is an actual real world client for the outcome of this project or if it has some other purpose.

3.3.4 Project Task Description

The main function of this section is to explain what is going to be done using the suggested headings below and as shown in the sample. The headings are intended to be precise and if students ignore or change them or use them for any other purpose the work will be rejected. The actual selection of headings will depend on the type of project: Study or Engineering.

Engineering Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct an Engineering project task description and must expect to go over them many times before a concise and useful description is formulated. For Engineering projects please note that a functional description means that one says what the application will do for the users and not how it might be built or what architecture is involved.

Situation Overview – express here a concise and high level description of the existing or proposed application area.

Presenting Problem Definition – a concise definition of some real world problem related to data processing of some kind. This is an important step since unless one can clearly see what the problem is then any solution suggested may be deficient in some way. In most cases the problem definition in engineering projects is related to elements such as data availability, searching, access speed, storage, processing, accuracy, sharing, reporting, entry, updating, deletion, control, security, volumes, segregation, consistency, worker efficiency, process systematization, communication and so on. For the purposes of writing a specification the expectation is that students will focus their problem definition on one major aspect of the application scenario. See Workbook 6 section 6.2 and 6.6.

Real-World Target – a summary of the real world effects that are expected if this problem can be solved or partly solved.

Application Proposal – expressed as a concise description of the main system functionalities. When describing the main functionalities it should be done at a high level and it is recommended that they are all coherent and there should be no more than 10.

Ethical Overview – express here a concise review of any ethical impacts of gathering the primary data, processing it or system usage.

System Architecture – a concise description of the major or main architectural elements of the proposed application

Strategic Value – expressed as a concise argument that the application is able to deliver to the stated problem definition.

Study Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct a study project task description and must expect to go over them many times before a concise and useful description is formulated.

Project Topic Area Overview – a concise description of the topic area aspect being covered.

Situation Overview – a concise, high level description of the context in which the research is set.

Presenting Problem Definition – expressed as a concise statement of the single underlying problem leading to this study. This is an important step since unless one can clearly see and define what the problem is then any solution suggested may be deficient in some way. Study projects look at an aspect of strategic business IT and that might cover technology effectiveness, IT investment, user acceptability, development or improvement plans, feasibility studies, legacy systems and so on. See Workbook 6 section 6.2 and 6.6.

Real-World Target – what desirable real-world benefit is likely if the stated problem can be resolved or partially resolved. (See Workbook 6 section 6.3)

Research Question – expressed as a concise question that captures the problem definition and the real-world target. See Workbook 6 section 6.7 and 6.9.

Personal Theory – expressed as a concise and focused rationale regarding what an answer might be to the Research Question. See Workbook 6 section 6.5.

Intended Project Outcome – write a concise statement that expresses the expected major project outcome as it arises out of the stated problem definition and your personal theory and would be an answer to the Research Question. See Workbook 6 section 6.4, 6.7.4 and 6.9.

Strategic IT Value – here it is necessary to discuss ones intended project outcome and show that it is or leads to a Strategic Business IT impact that could eventually resolve the stated problem definition and hence generate a Strategic Business IT value. See example in Workbook 4.

Ethical Overview – a concise review of any ethical impacts of gathering the primary data, processing it, presentation or usage of results in the form stated

3.3.5 Overall Project Aim

This is a vital point in the specification because in a very concise manner a researcher brings together in one aim: the main project **activity** to get a stated project **outcome** as well as telling us what **data** is the focus of the activity and finally what the purpose or **target** for the project outcome is in relation to real-world problem resolution. It is essential that you fully understand these four elements as described in Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3.

3.3.6 Set of Project Objectives

To meet an overall aim it is necessary to achieve a number of milestones indicated by a set of objectives generating minor outcomes. Objectives can be hard to write and it is expected that there would be between 3 and 6 of them. See Workbook 6 section 6.11 and 6.10.2, Workbook 9 section 9.6.3.

3.3.7 Research Design

The Research Design is about the core elements that generates primary data and processes it into the form of answer expected (your project outcome). The Research Design is divided into two phases.

Design for Collecting Primary Data - a process or processes used to define and create a primary data collection. It has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the actual data and present that data.

Design for Processing Primary Data - a process or processes used to manipulate the collection of primary data to get the form of answer expected.

A useful analogy for a Research Design is that it is like deciding that you want a sponge cake and then working with a shopping list (a list of primary data that you want) to collect a bag of ingredients (collection of the listed primary data). Once we have our ingredients (primary data) we use a recipe to prepare and mix them (pre-processing the primary data) ready for the final processing step to bake the cake (like generating your form of answer). To reverse the analogy, if you were going to make a cake you would not walk into a shop and just pick up a random set of ingredients and then mix them all together into some muddle, bake it and expect a cake to emerge - no one but an idiot would do that would they?

The suggested headings to use are as follows and you are recommended to use them carefully in a step by step manner to construct a research design. You must expect to go over them many times before a concise and useful design is formulated. In the examples I have added the step numbers for clarity but you do not have to do that in your own work as long as all the elements are present.

Engineering Projects Research Design Format

Research Design Phase 1 – Requirements Collection Process

This phase is concerned with a process that generates a reliable collection of primary data which in an engineering project will be a set of requirements. See Workbook 7 section 7.10.

Define – here one bases the definition of requirements on the outline proposal document.

Location – state where or from whom the requirements can be found.

Collection Protocols – here it is necessary to select appropriate collection protocols such as: interview, observation, records searching and so on needed to collect the requirements under the standard four headings: Functional, Non-Functional/Performance, Technical and Usability. See Workbook 6 section 6.6.1.

Requirements Presentation – the requirements data once collected will typically be presented as interview transcripts, notes and copies of documents and lodged in the project document appendix as a kind of requirements catalogue.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulate it to get a design for the application. This is in two sections.

Overview – show how the various requirements are expressed in a design.

Specific – in any design there will be aspects that have no obvious means of expression and such aspects are typically written as a list.

Study Projects Research Design Format

Research Method – make a selection and write concise rationale for its use. See Workbook 7.

Research Design Phase 1 – Primary Data Collection process

This phase is only concerned with generating a reliable collection of primary data and is based on the Basic Activity for Generating Data but to be it has to be surrounded by a complete process.

Basic Activity for Generating Data – a concise description of the activity that forms the core of the primary data collection process. See Workbook 6 section 6.8 and 6.9

Primary Data – outline primary data items to be collected. See Workbook 6 section 6.6.

Location – a concise description of where the primary data may be found. In practice it may come from almost anywhere including extraction from existing secondary sources.

Collection Protocol – a concise description of the actual collection procedure which may be based on one or more of the following: interviews, questionnaires, observation, roles playing, document analysis and so on. See Workbook 6 section 6.6.1

Primary Data Presentation – expressed as a concise description of the way in which the primary data will be presented.

Research Design Phase 2 – Processing and Presentation

This phase is only concerned with a processing the collection of primary data in order to get the expected project outcome.

Design of Pre-Processing for Primary Data Collection – concise description of the processes applied to the raw primary data collection to generate a refined collection of primary data structured in a fashion that makes it suitable for generating the intended project outcome. (Workbook 6 section 6.6.3) (Please note that this step will not always be needed)

Design for Primary Data Presentation – presentation of data collection generated from the pre-process step - if that step is not needed just a presentation of the primary data.

Design for Generating the Intended project outcome – here the primary data collection (pre-processed if necessary) is used in some algorithmic or heuristic fashion to generate the intended project outcome.

3.3.8 Logistics and Tools

In this section the practicalities in terms of tools and time need to be considered. It is only necessary here to state things that are specific to this project, so it is not required to say things like: the library, Word, Excel, paper, pen, SPSS and so on as these are common and almost always available everywhere.

3.3.9 Outline Content List for your Project

This should be detailed enough to ensure that there is a clear idea of the final structure of the project document. Please be careful with the essential elements as indicated on the marking forms since if they are omitted a significant number of marks may be lost in the final project. See Workbook 9 table 6 and section 9.3.5 where typical chapter and section headings can be found. Workbook 11 or 12 (marking forms) need to be consulted so that no essential elements are omitted

3.3.10 References

This section is used to assess how well a student has prepared for the project activity. The University will want to see that the reading is current, comprehensive and focused on the topic area. It is expected that work in the specification will be supported from the literature particularly in the outline description and research method sections. Unless the literature is seen to be used in the various sections of a project specification it may not be approved although it is not expected that one cites from every book in a reference list. See Workbook 5 and Workbook 8 and make sure citations are in the Harvard APA style.

3.3.11 Project Plan

The plan must be developed by looking at ones contents list and considering what activities are necessary to generate the various project objects. Aim for around 12 to 20 activities lasting at least 18 weeks with any suitable start date. A project activity is something that is significant and requires planning and monitoring. So for example:

Prepare Metric Program – this is clearly a significant activity that has to be planned and monitored and so properly part of the plan

Select an Organization – this is an activity and might be important but it is doubtful if there really is a significant process involved here that has to be planned and monitored.

Outline Implementation Plan – this is not an activity so should not be in the plan.

The University will examine each plan and will want to see that it is focused on the project – the implication here is that it should be possible to see that a given plan supports a particular project idea not just a copy of one of the samples or is so generic it might apply to any project.

3.4 Testing Your Research Design

A design must amount to a logical plan that takes a problem definition to a description to the expected outcome that will resolve the stated problem. The following are a useful check that a plan is sound.

Practicality – consider whether one has the resources to be able to carryout a plan. This is a very serious step and must not be taken lightly. It is all very well to have an elaborate plan on paper and to think because it all sounds logical that it can actually be done. In many cases a crucial test of practicality is to be sure that one can get the data from the locations specified.

Credibility – here one is expected to be honest and decide whether the plan will result in useful data and outcome. It is unfortunately true that many research projects end up being trivial because of poor identification of data and more importantly the choice of appropriate collection protocols. It is also worth considering the data processing functions as they must also be credible.

Confirmability – this test is about what would happened if the same research was done a second time with the same data – would the researcher end up with the same answer. To put it another way, is the processing method too dependant on an individual and that dependence may lead to bias.

Trustworthiness – here we are concerned that the conduct at all stages is such that one could have confidence that the results are genuine and not manufactured.

3.5 Example Specifications

Here are some sample specifications, they are complete except for the contents list and project plans but they are not meant to be copied without any conscious thought and any obvious attempt to do so will result in specification rejection.

3.5.1 Example Complete Engineering Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students **MUST** think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Engineering) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – the customer is SIS and the application is expected to go live by June 12, 2006.

Project Title - An Assessment Marks Processing Application. (See Workbook 6 section 6.13).

Situation Overview

Currently, the core processing is done by staff members dealing with their own assessment marks, typically using Excel. The staff member then forwards his marks sheets, usually in paper form, to the administration office where the marks are collated using Excel to give an overall score for each student. These two marks sheets: individual unit marks and overall student marks are then presented to the Board of Examiners for scrutiny and acceptance. The process ends when a transcript is sent to each student detailing their results for that semester.

Presenting Problem Definition

The actors feel that the root problem is about consistency and accuracy given the sensitivity of the data but coupled with difficulties with storage, retrieval and reporting. (See Workbook 6 section 6.2 and 6.5)

Real-World Target – the desired effects here are that consistency and accuracy are both improved but at a reduced workload. (See Workbook 6 section 6.3)

Application Proposal

Based on the presenting problem there an application is needed that can offer us consistency and accuracy in the processing of assessment marks, both by unit and by overall student performance. The system to be called a mark processing system and it will have the following main functionalities.

Functional Requirements

1. Store name, address, year of study, name of course and unit details of all registered students.
2. Store the assessment patterns for each unit including weights and pass mark.
3. Allow for the entry, updating and deletion of any or all records.
4. Allow for the entry of assessment marks for individual entry or by batch updating via CSV
5. Report on marks for each unit including basic statistics.
6. Report of overall student performance, including basic statistics.
7. Produce student transcripts.
8. Provision for other ad hoc reports at a later date.
9. Secure access to individual results to be available to students through a portal.

Non-Functional and Performance Requirements

1. Store records for at least 6 years.
2. Allow for at least 6 simultaneous users
3. System must be capable of processing all the data and providing the reports within 10 working days. The estimated current volume is 145,000 data entries and 139 reports but this is expected to grow by about 7% per academic session.

Technical Requirements

1. Be developed in MS Access 2003.
2. For use under Windows XP.
3. All processing activities, including reporting, to be carried out using native Access facilities.
4. All processing is to be done using Access VB and no macros are to be used.

Usability

1. Be developed using normal windows formats and standard colours.
2. Fonts use in screen to be no smaller than 9 point and standardised at Ariel Narrow.
3. Assumed screen size to be 19".
4. Report to be printed as appropriate but with fonts never less than 10 point.
5. Data entry load per screen to be as recommended in DEF 981.90.
6. There should be some consideration of access via the portal for the visually impaired.

Ethical Overview

The collection of requirement here does not present any ethical problems. However, when in use the system contains personal and sensitive data and this aspect must be considered in the design

System Architecture

The intended application is essentially a database system with a web link. It will therefore have two interfaces: one a direct link to the database through the Access application and the other through a secure web interface routed through a portal but with only read access.

Strategic IT Value

The proposed application and its functionalities should address the presenting problem very well. In particular controlled data entry, data storage and reporting. This should reduce administration overheads and costs in a cost-effective manner.

Aim

To build an assessment marks processing system using standard MS products in order to ensure consistency and accuracy in the processing of student results. (See Workbook 6 section 6.11 and 6.11.1, Workbook 9 section 9.6.3)

Objectives (See Workbook 6 section 6.10 and 6.10.2 and Workbook 9 section 9.6.3)

1. To produce a detailed, departmentally based, marks processing requirements document.
2. To produce a detailed marks database design using standard documentation protocols.
3. To produce a detailed assessment functional design to include data entry, updating, deletion for marks processing and reporting.
4. To design the secure portal for student use.
5. To produce and evaluation report of the marks application.

Research Design Phase 1 – Requirements Collection Process

This part of the research design is concerned with constructing a reliable primary data collection for later processing into the form of answer expected. In this case the primary data collection is a set of detailed requirements for the marks processing application. The primary data that we need is related to the proposed major functionalities stated earlier and given to us in the form of a proposal. For each of the functionalities it is now necessary to decide. (See Workbook 7 section 7.10)

Location – The requirements can be found at various locations in Portsmouth. In particular

Detailed Functional Requirements: the appropriate targets for this exercise are: SIS office administrators, departmental course leaders, individual academic staff, Heads of Department and the University registry (for regulatory aspects). It may also be useful to make contact with a number of external examiners to ensure that the reporting arrangements are acceptable. In addition there will be various documents such as regulations and marks sheets

Non-Functional and Performance Requirements: the appropriate targets here are the Registry since they set examination and graduation dates as well as define the necessary reports. The office senior administrator also needs to be consulted for staffing and usage issue. During this process there must be detailed discussion with the department and the Registry over security issues as this is a major ethical issue. In addition there will be various documents such as regulations, external examiner reports.

Technical Requirements: the appropriate target here is the departmental technical to establish hardware and software profiles. It may also be necessary to discuss network and security issues with the University central computing department. It may be necessary to see network and PC specifications and various security profiles.

Usability Requirements: the basic design is based in Windows protocols so there are no particular requirements to be gathered. However, because it is possible to implement interfaces in a few ways particular usability requirements will be ascertained by use of a mock-up used with the administration staff. With regard to the Portal there will need to be discussion with the University webmaster over formats and protocols to be used. In addition there will be various documents defining standards and formats.

Collection Protocols – The collection is essential a survey format where each requirement aspect will be discovered by just three formats: (See Workbook 6 section 6.6.1)

Detailed Functional Requirements: expressed as interviews, document analysis (marks sheets and regulations) and some observations. It may also be necessary to use observation to examine any existing Portals.

Non-Functional and Performance Requirements: interviews, document analysis (marks sheets and regulations) and observations.

Technical Requirements: interviews and document analysis (system specifications and profiles)

Usability Requirements: interviews and document analysis (system specifications and profiles). In addition it will be necessary to run some focus groups to look at various interface design option by means of mock-ups.

Requirements Presentation – the requirements data once collected will be presented as interview transcripts, notes and copies of documents. These artefacts will be reviewed and a tabular format used to present the requirements and lodged in the project document appendix.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulates it to get a design for the application. This is in two sections.

Overview – here the vehicle used to present the various requirements in a design format will be UML. The mechanism will be to take the written requirements documents and map them to a suitable diagrams in the form of use cases, class diagrams and where appropriate collaboration or sequence diagrams.

Specific - where necessary a written list will be provided. These will mainly be used to state unambiguously the various non function, technical and usability details.

Logistics and Tools – Required Resources

All the hardware and software are available at the Client's premises and all work including requirement gathering will take place there. The major products needed are: Dream weaver and MS Access and scripting will be done using ASP.

Outline Content List for your Project

See project guidance notes for samples and they can be found in Workbook 9 section 9.3.5 and table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See Workbook 8)

Walker (2001), IT Problem Management, Prentice Hall, 0-13-030770-5

Bruton (1997), How To Manage The IT Helpdesk, Butterworth Heinemann, 0-7506-3811-7

etc

Project Plan

Any clear format may be use but a typical format (but not events) can be found at the end of the Study Project sample specification.

3.5.2 Example Complete Study Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Study) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2653)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – no customer involved and project results will be used to produce a research paper.

Project Title - Quality Control in Program Development - A Possible Strategy (Workbook 6 section 6.13).

Project Topic Area Overview

There is much interest in Software Quality assurance at present and this is for obvious reasons. Software applications are unlike normal products which wear out and can be tested over time to see where most wear takes place and hence calculate a mean time between failures. By this means failure can be effectively prevented by maintenance. However, in software such wear does not occur although an analogue of this is when other hardware and software components around the software, or the application itself changes and hence problems arise. Typically, we test program code and the more we test the code the more certain we become that it is robust.

Situation Overview

The research is set in The University of Portsmouth with the School of Information Systems. In that context it will focus on the programs produced by first year computing undergraduate students.

Presenting Problem Definition

The problem for developers is focused on knowing when code is robust and ready for release. (See Workbook 6 section 6.2 and 6.5).

Real-World Target

The benefit that would accrue in the real-world if this problem can be resolved or partially resolved is that developers can feel more confident about their product and therefore not risk costly development overruns and compensation claims from clients. (See Workbook 6 section 6.3)

Research Question

How can developers feel sure that software applications are ready for release in order to prevent costly overruns and client disappointment? (See Workbook 6 section 6.7 and 6.9)

Personal Theory

The topic is fraught with difficulty because there is no accepted way to measure program code to see how good it is or even to see if it is correct. Blithe (2002) explains that it is well understood that it is not normally possible to measure, using an interval and ratio scale, in any meaningful way the quality of program code. However, it might be possible to find some means of 'indicating' the quality of the code in the sense that one might be able to pick outliers by taking certain kinds of measurement. It is therefore suggested, that simple measurements of various code properties might be used to pinpoint outliers and hence shorten the testing cycle by transforming the measurement statistically into a pseudo Interval and Ratio scale form which is called Planar Similarity. (See Workbook 6 section 6.5).

Intended Project Outcome

It is expected that the form of the answer arising out of this theory will be a demonstration in the form of a report with graphical evidence that endorses the proposition that Planar Similarity is an appropriate software quality indicator in that outliers can be detected hence assuring the measurement process. (See Workbook 6 section 6.4 and 6.9)

Strategic IT Value

If Planar Similarity is indeed a useful measure of software quality it can be used routinely to examine software in production and give an early indication of quality and that will lead to shorter test cycles and hopefully more reliable software installations and a consequent reduction in cost. In fact Clitheroe (2003,p6) has suggested that detecting all code faults at the initial coding stage might save as much as 23% of development costs. (See example in Workbook 4)

Ethical Overview

There are no current users of the process being developed there would not seem to be any ethical consideration of importance. However, it is necessary to explain to the students supplying the sample programs the purpose of this study and assure them that none of this information will be used for assessment and allow them access to the results if they so wish.

Aim

To report on the efficacy of the Planar Similarity measure using simple metrics as a means of finding outliers in program code and hence reduce coding errors leading to development cost reduction and client approval. (See Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3)

Objectives (see Workbook 6 section 6.11 and 6.11.2)

1. To model the software construction process.
2. To report on appropriate simple and synthetic metrics that might be used as indicators of quality in application programming code.
3. To define a process that will extract the defined metrics for any piece of code.
4. To document a suitable statistical process for reducing the metric value set to just two dimensions.
5. To analyse and report on the data, including outliers, and hence derive some general conclusions regarding the utility of the Planar Similarity metric.

Research Design - Research Method

The chosen method will be case studies since I want to see the impact of the measurement process within a defined context and of particular interest in that context is student programmers with differing abilities in writing business application style programs. The case criteria are simple and amount to selecting a sample of students at a set point in their first year of study and a set of matched programming tasks. (See Workbook 7)

Research Design - Phase 1: Primary Data Collection Process

This part of the research design is solely concerned with constructing a reliable primary data collection for later processing into the form of answer expected.

Basic Activity for Generating Data

The basic idea is to compare a new piece of code with an existing piece that is known to be sound and take a series of measurement on each one that might highlight any differences and so indicate an outlier. The idea has some support based on early studies carried out by Sheene (1999) who noted that a reasonable means of indicating quality in program code is to compare similar pieces of code by calculating several metrics for each piece although he did not define how this might be done practically. (See Workbook 6 section 6.8, and 6.9)

Primary Data

This study will define 20 software metrics which will be calculated automatically and for each sample programme. The metrics that form the primary data collection for this research will be such things as: function density, function count, cyclomatic complexity, data associations, decision count, decision density, number of variables, number of function calls, etc. (see Workbook 6 section 6.6)

To set up the case studies three computer program specifications will be drafted with the students working in 'C++'. The specifications will be written so that the defined software application is, in each case, of a different style and progressively more difficult. An expert in 'C++' will produce a set of generics to match the requested programmes – it should be noted that a generic is an outline or skeleton of certain kinds or classes of program.

Location – The sample frame is all first year students on computing courses at Portsmouth University. This is around 350 students and my calculated sample size is 200 students, however, since the data collection process is automatic all 350 students will be used in this study.

Collection Protocols – The collection is essentially a survey format where the students will be given the relevant generics and the specifications and asked to write three computer programs of increasing complexity, one in each of three semesters. In this case there is a large data set to be collected and it is not practical to do the collection by hand. In view of this an application will be written that will process each student program so that metrics may be calculated automatically and stored in a suitable electronic file. Students will be requested to deposit their programs on set dates into an online drop box for both marking (not part of this study) and metric calculation. (See Workbook 6 section 6.6.1)

Primary Data Collection Presentation

The sets of primary data will be available in the project document appendix and will be presented in tables where the rows represent the sample programs (one row for each sample) and the 20 columns the metric values.

Research Design - Phase 2: Processing and Presentation

This part of the research plan will take the whole collection of primary data and manipulates it to get the expected outcome form, which was a demonstration that outliers can be detected hence assuring the measurement process. The processing is in three steps: manipulate the raw primary data, presented the processed data in graphical form and extract from the graphs features by manual inspection.

Design of Pre-Processing for Primary Data Collection (Workbook 6 section 6.6.3)

The metric data sets will be read directly from the files produced in phase 1 and then statistically processed to define a similarity measure for each program using principal component analysis and multidimensional scaling. The outcome of this processing will be pairs of values, one pair for each sample program, suitable for plotting in two dimensions.

Design for Results Presentation

The pair of values from the first processing round will be plotted in two dimensions, together with the results for the generics producing three graphs one for each program specification.

Design for Generating the Intended Project Outcome

Once the graphs are available it is then a simple matter to look for outliers in particular and attempt to explain their distance and orientation from the generic and other programs in the class. The contention is that similar programs will cluster together and ones that are different (even though the specification was the same) will show up as outliers and can be identified and examined to see why that difference occurred. It is hoped that the results will be similar for all three program in that data set and hence demonstrate that complexity is independent from planar similarity.

The final step is to use the identified outliers to go back to the actual program code to explain why the code produced the outlier. In this way it will be possible to get an indication of why a given program is deficient. This final processing step allows me to generate my report on Planar Similarity that contains my overall findings and evidence on its utility.

Logistics and Tools – Resources Required

All the hardware and software are available at the University. Since the data collection process is automatic the use of staff resources is minimal.

Outline Content List for your Project

See project guidance notes in Workbook 9 section 9.3.5 table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See workbook 8)

JKM Quality Assurance Handbook (Company Confidential)

Garlick, F. J., (1993), Planar Similarity - A New Synthetic Metric, SQM, Elsevier, 1-85312-225-4

etc

Project Plan - Master Schedule expressed in weeks (You may assume that a project take about 18 weeks to complete)														
Dates are Mondays	March				April				May					etc
Event	6	13	20	27	3	10	17	24	1	8	15	22	29	etc
Literature Search														
Identify metrics														
Write Metric program														
Etc.														

4. WORKBOOK 4 – LITERATURE REVIEW & STRATEGIC IT VALUE NOTES/EXAMPLES

This is a sample of what is expected in assessment 1a, however, it only shows two elements: the strategic business IT statement and the short Literature Review. Try to keep in mind that this is just ONE example and do not try to copy it blindly or try to fit it into what you want to do.

Strategic IT Value

This work was based on trying to resolve or partly resolve the problem of low quality code leading to the need for costly re-work at later stages in the development cycle. The importance strategically of this work is that the outcome: a definition of new software metric will imply that it is possible to identify poor application code and this can be done at an early stage in the software development life cycle. The importance of this is that corrective action can be taken early in the development cycle and as a consequence costly re-work late in the cycle can be avoided or reduced. A secondary or added value element is that the results will allow the identification of good programming standards and this in itself will also lead to improvement and strategic advantage on all products delivered.

Tutor Comment

The key element here is that one relates the expected outcome or form of answer to its use in resolving the problem theme that was the basis of the project, and hence demonstrate a strategic business IT value. Failure to create a clear argument based on the problem theme and outcome leading to a strategic business IT value will mean loss of marks.

Literature Review (See Workbook 5 but note section 5.6 in particular)

Hiskett in his 1987 seminal paper on metrics defined several apparently useful metrics, the best known of which are 'program vocabulary' and 'program length' which are essentially metrics that count operators and operands and their usage in a given piece of code. Hiskett's metrics are easy to calculate but he was unable to show any strong correlation between his measures and program quality as defined by experts in the field. Similarly, Rogers and Hamerstein tried to use Hiskett's metrics as predictors of MTBF in accounting software but the results were inconclusive and no link could be found between the metrics and the type of software (functionality), accounting in this case, and the metric used.

Garlick, Sheene and Southwood (1999, p450) attempted a new approach that involved the notion of similarity, which they called planar similarity – that is two programs could be defined as similar because: they are written in the same language or they perform similar functions or they were written to the same standards or they are written to the same specification or they were written by the same team or finally they perform the same function. Their work is aptly summed up in the opening paragraph of their paper:

"The nature of any true measurement is easy repeatability and this implies that the style of measurements form a suitable metric space. This means that we need to define the nature of the similarity before we define a measure. In principle this is simple since it is easy to name the similarities but in practice it has been difficult to articulate a precise definition."

The similarities described above deserve further explanation but here only two of them in combination are used: similar language and similar or same specification. Similar language is easy to understand but at first glance it would seem that if two different programs are written to the same specification they are bound to be the same. However, after a little thought, it is obvious that if two different people write two different programs to the same specification the programs are certain to be different in many respects. It follows that the basic, though loose, hypothesis is that if planar similarity can detect a similarity (alternatively difference) in these programs - written to the same specification but by different people - it might be possible to use planar similarity to detect differences between two or more programs against any defined mode of similarity. Conversely, if it cannot be shown that a similarity exists between two or more programs written to the same specification then there is no hope whatever of showing any other kind of similarity with this metric.

Two final points need to be considered: what exactly is meant by software quality and why would a similarity measure be a good indicator of quality? To answer the first question we have only to refer to Kitchenham's 1998 paper where she defined five kinds of quality, briefly:

Transcendent View – quality is a kind of innate excellence, something felt rather than seen.

Product Based View - quality is related to the content/attributes of the product.

User View – quality is seen as equivalent to fitness for purpose.

Manufacturing Based View - quality is equated with conformance to specifications.

Value Based View - provide product at an acceptable price and conformance to a specification.

In this study the transcendent view was the one chosen as the basis of the definition of quality. The meaning of this view is defined by experts in the field – that is, can an expert in, say, Java programming make a judgement as to whether a given piece of code is good or bad – well, here it is argued that such an expert can and does such tasks routinely. Curiously there is very little literature on this idea of expert opinion within the software community but Gavin as early as 1978 touched on the subject. However, it is a reasonable conjecture and it will be used in this study – interestingly, if it can be shown that planar similarity can detect similarity (or equivalently differences) then it would also support the conjecture that experts can judge software quality.

Finally, the study will rely on the ability of experts to judge quality in software. This judgement is exemplified in the production of exemplar or generic programs. Garlick (2003, p98) has written extensively on this subject and the work is well known and will not be fully reviewed here. However, it is possible to define classes of program modules - validation, input, calculation, reporting and so on – it follows, that using the idea of similarity it is useful to create a standard or *generic* program or module for each class. Such a program can then act as a base line for all planar distances related to its application class and hence be a measure of similarity (or difference).

Using Garlick's idea we can let experts define our generic and then use that to compare with other programs – if we declare a difference then in simple terms we need to look at that program because it might be of poor quality and conversely if we declare no difference then we can fairly conclude that the program is sound.

Tutor Comment

The literature review is supposed to be a student's own work. As such it is a discourse that outlines the major areas of a topic area but amounts to an essay which is the student's alone. In practice this means that students must read deeply into the subject and then weave what is read into what the student already knows or believes in order to create a useful summary of the topic that will form a strong base for carrying out the actual primary data research - this implies that you 'master' the subject area and become expert in it.

It follows from the above that if all you do is copy or paraphrase from various sources without any significant comment or analysis on your part then it amounts to plagiarism and is worthless.

One final point is that when you write up your review in your final project document you should use various sub-headings and other formatting elements to structure the section to make it readable and meaningful.

5. WORKBOOK 5. LITERATURE REVIEW

The main function of this review is to ensure that one's mind is prepared with all the specific problem area knowledge that it needs to carry out the project and its primary research. In practice this implies the rather difficult task of integrating different ideas, theories and experiences into a thematic, informative, complete and clear discourse on your chosen subject area.

Preparation of the mind is done through adding your critical evaluative comment on what you find in the available literature and such critical reviews are typically hard work and not about downloading a few articles from the internet. The key characteristic of the greatest thinkers in history was absolute and unswerving honesty in all their thinking and that principle has never changed. They used their intellect and reasoning abilities to the full. They were honest no matter what the subject be it religious, political, business or academic. These men would not accept dogma from religion, politics or academic sources without subjecting it to serious critical questioning and of course this often meant great suffering for them.

5.1 Plagiarism

The KEY is honesty – without that your work is worthless – you may be able to fool some people but as Shakespeare said "This above all: to thine own self be true, and it must follow, as the night the day, Thou canst not then be false to any man. So when you plagiarize I may not know, the University may not know but YOU will always know that you obtained something falsely.

Plagiarism means passing off other people's ideas as your own. In academic life, it is one of the worst things that anyone can be accused of, as it is a form of stealing or cheating. It is fully expected that students will carry out research prior to completing a piece of work. This may include the use of books, journal articles, reports, manuals, notes and so on as source material. The material may be public, restricted to a closed set of people or with a security classification), or privately communicated. The principles are the same whether the material is on paper or in an electronic format. When you refer to an idea in a piece of your own work, it falls into one of several categories:

Common knowledge - many people know it and the information does not belong to anyone person but it cannot normally be deduced by you it has to be learned. It is probably talked about in several sources: the world is round, computers contain both processors and memory, OO is routinely used in software construction and so on. If you are sure that it is common knowledge, you do not need to cite a source. Be careful, authors will often write down in their own work things that are common knowledge so quoting them in that instance amounts to saying that a bit of what is common knowledge actually belongs to that author and that of course is an absurdity.

Obvious – many people know it and the information does not belong to anyone person but it can be deduced. It is probably talked about in several sources: companies tend to grow as time goes on, when the sun goes down it gets dark and so on. If you are sure that it is obvious you do not need to cite a source. Be careful, authors will often write down the obvious in their own work so quoting them in that instance amounts to saying that what is obvious to every one actually belongs to that author and that of course is an absurdity.

Published – this refers to an idea that found in a specific source or sources which is not common knowledge nor obvious but is nevertheless useful – in these cases you must always cite the source or sources of such an idea.

Original – you may include freely original ideas of your own. However, be aware that if the reader sees an idea that is not cited and is not common knowledge nor obvious, then they are entitled to believe that either it is a new idea published by you or you have plagiarised it.

5.1.1 Identifying Plagiarism

Plagiarism does not occur only when you copy words verbatim. Plagiarism is about ideas, and even if you express the idea in your own words, you may still be guilty of it if you do not credit the source. However, expressing an idea in your own words might often be good scholarship. The difficulty is that anyone can copy and paste a phrase, sentence or paragraph and cite its source. This is technically not plagiarism, but it's often very poor scholarship since it is obvious that such an activity tells us nothing about the learning, if any that has occurred

Scholarship is about showing your understanding and criticism of ideas. Simply copying, paraphrasing or summarising can only show understanding only to a limited extent. You need to "add value", that is make your own contribution to knowledge, to what you've read and you can usually only do this by expressing an published ideas in your own words and mingling them with your own thoughts and ideas.

5.1.2 Common Critical Devices

The essence then is to infuse your work with your own thoughts and ideas and let these mingle with what it is you have found in the literature. The most common forms of this are:

Interpretation - explaining and expanding on what you have found.

Criticism – discussing in order to judge whether the ideas are good or bad.

Decomposition or Analysis – to tease out the constituent parts of an idea.

Synthesis – by means of discussion and explanation link separate ideas together.

Selectivity - showing which ideas to include and which to discard.

Abstraction - taking an overview or defining a model or framework, usually by looking at examples.

5.1.3 Common Literature Tools

The following are the most common means of incorporating, in a scholarly fashion, the work of others into your own written work (a fuller discussion of these tools may be found in the notes).

Copy – use the exact words using quotation marks. A good rule is that each quote holds a single main idea, which you want to use and then you must introduce it and then follow it up with discussion.

Paraphrase – expressing something that you have found in the literature in your own words - the intention being to simplify, explain, or interpret a complicated idea. But take care there is a very fine line between simplifying, explaining and translating something and just being lazy.

Summarise – producing a précis or abridgment of a part of the source we have found. Essentially one is trying to capture the main points in an argument.

Analyse – the purpose here is to offer a detailed examination of some whole by scrutiny of its parts.

Synthesise – here the idea is to take parts and put them together into a new whole for some purpose.

You might find it useful to remember: copy in order to discuss, paraphrase to simplify, explain or interpret, summarise to capture the main points, analyse to understand and synthesise to build something new.

5.1.4 University Review Assessment

When the University looks at your Literature Review it will be trying to decide if you are committed and prepared for the topic and working at Master's level. If your work is poor in terms of structure, content and form you will find yourself failing. This is NOT necessary so long as you put in the work and ensure you understand how to use citations and the literature. I want to encourage you to do good work - it will ensure that you pass well and it makes your work a pleasure for the Examiners to read.

5.2 Review Content

The review is about your topic area and about you becoming sufficiently expert in it to deal with the problem that you will have uncovered. The intention is for you to offer a discourse that is focused, relevant, authored, measured, evaluative and expressed as a dialogue. (Notice the acronym FRAMED)

Focused – this means that your whole effort is focused on the topic area and the particular aspect of it that you are pursuing. So do not be tempted to add in other things just because they might be useful, interesting, and novel or you just have nothing else to say.

Relevant – any topic area aspect will itself normally represent a large body of knowledge and so one needs to continually ask if a particular element in the knowledge domain is relevant to your particular study.

Authored - any literature review is to be written by its author. This sounds obvious but it is all too easy to fill up a review with cited quotations, paraphrases, summaries and so on so that the 'hand' of the review author is not evident anywhere in the work. When this happens it is not an evaluative review at all but simple plagiarism. The author's 'hand' must guide and direct the review in an evaluative fashion so that the review is a message from the review author and not a recitation of what has been found elsewhere.

Typically this is done by using ones own skills and knowledge to introduce, comment, add to, modify and extrapolate from various primary sources available.

Measured – this is a matter of selecting and using the focused and relevant materials that you have found. Unfortunately, It is all too easy to pack in information in excruciatingly precise detail and so end up with a laboured entry that treats your readers as if they were completely ignorant of the subject area. So here one needs to just say honestly "is the entry a measured response to my and my readers, information needs".

Evaluatory – authors sifts through the primary sources looking for materials to use. The essence of this sifting is an evaluatory outlook based on an awareness of your problem theme and your topic area. Care is needed because this process is not about searching for materials that you agree with or like in some way. Instead it is a contextualised response (what do you already know) and that may mean you find materials that are new to you, materials that make you change your own knowledge base and often materials that completely replaces what you thought was solid.

Dialogue – a review is a form of argument because good ones are based on a strong theme and in them one is trying to explain to, and convince your readers about something and so it is best if you think of it as a kind of dialogue in which you vicariously challenge them about your review theme and content.

5.3 What goes into a Literature Review

It will depend to a large extent what it is you are working on and what you want to say but the following list give some common ideas of content.

Challenge – this is two way: what you read challenges you and you challenge what you read for validity and applicability and so one might find new ideas or change our perspective.

Consolidation – reading widely consolidates your own knowledge base in that it can confirm or show any gaps in your knowledge.

Exploration - implies searching for new ideas, theories, concepts, rules and so on.

Self Check - affirm what we know for currency and accuracy

Support - the reading might support or be in opposition of ones views

5.4 Integrity and Evidence

This heading sums up research - integrity because it must be your own work and evidence because you MUST be able to show that your results have value. There are basically 4 strands to good work as follows

Dogma – this simply means things you have to take at face value. Most often they are things that are not open to reason in the sense that one is not allowed to question them and in some countries you can find yourself in serious trouble if you do. The problem with dogma is that by definition there is no logical support for it. Just to use a simple example, some faiths require you to have a beard or not eat pork as a matter of dogma – in such cases we usually cannot logically deduce that this is a right or wrong thing. It may of course be simpler than that since we all invent our own dogmas from time to time – for example it may be very simple such as 'I will never buy a Ford car'.

We all accept dogma but that really is not the issue – the issue is that we should not accept it without some critical thought. There is at least one rational way of exercising critical thought on dogmatic issues and that is asking is the outcome of actions based on it good, bad, neutral or at least does not harm anyone. The trouble however, is that dogma sticks to us like super-glue and we will often go to great lengths to defend it and almost always this is done by sophistry (worthless arguments) and of course the notion of what is good or bad is not easy to define.

Reason – this is the ability to be logical and reason about what it is you are reading or writing. That is you are encouraged to ask questions and seek for a deeper understanding. This may imply that you accept new information, modify what you already know or reject something as no longer valuable.

Honesty – here we are talking about not taking things at face value and being honest with yourself about what you are reading or writing and asking does it all make sense and is it coherent with what I already know.

Motive – this aspect is about your reasons for wanting to read or write something. Now such motives can be high minded or they may be base. One must therefore always guard against tendentiousness (the author simply wants to convince a reader of something and may use any means to do it) in ones own writing and be watchful for it in the writing of other.

5.5 Literature Sources

The available literature is classified broadly speaking into the two kinds described below and ideally we only want to use primary sources.

Primary Sources – that is the first published documents. One can be really pedantic and say the real primary sources are the author's manuscript or autograph but these days we are satisfied with published sources. It will however, often be difficult to establish that something is indeed a primary source.

Secondary Sources – in almost every document you see, there will be elements attributed to other authors – these are then secondary sources.

Be careful not to confuse the above definition with those for primary and secondary data. When we talk of primary sources we are obviously referring to something that is published and exists whereas with primary data it will not exist until a researchers defined, locates and collects it.

5.6 Basic Writing Rules

For Study projects a full literature review will be needed but for Engineering projects the requirements document forms part of the Literature Review. However, even in Engineering it is necessary to write a short review just to form a technical backdrop to your project. It may help you to remember there are two cardinal rules when writing – they are simple:

Respect – always have a deep respect for ones readers and make it easy for them to understand what you are saying.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying. The key task is to formulate ones own ideas, in your own words but one does this by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

5.7 Literature Assessment

When assessing this element the University will look at how YOU use the sources in what you write and at the range of sources that you used. If either is judged deficient your work may not be accepted as the view taken will be that you are not prepared for work at this level and on this topic. It is expected that all your sources will be mostly primary ones. If there is some reason why this is not possible it must be discussed with the Research Methods tutor or your project supervisor.

5.7.1 Literature Review Structure

All the following steps are iterative and you must expect to go backwards and forwards many times before you get a review with which you are happy.

List – Make a list of all the various topic strands that you need to know about. It may help you to think about strands such as: organisational, administrative, functional, social, technological, cultural, ethical and so on or some other structure best suited to you topic. Remember, this is not about writing down everything you know it's about giving your readers a focused discourse on your chosen topic area

Arrange – Use your prepared list above and put the topics into a logical and progressive order.

Theme – Decide on a theme that will link all the various topic strands together.

Structure and Content – Now use your themed list of topics and structure what you write using headings, subheading, paragraphs, bullets, tables, diagrams and so on.

Reading/Writing with the Intellect - This is normally thought of as a four stage process that applies equally to what is written (because it is going to be read by someone).

Understanding – this is simply taken to mean that we understand the words used.

Interpretation – are able to find meaning in the words used.

Evaluation – we ask does the meaning have any value – in essence we ask is it true or false.

Contextualization – this implies that everything we read is coloured by what we already know. This idea is taken much further in the idea of hermeneutics (see the notes).

Usage – the literature that you find and evaluate can be used to supplement your own work and demonstrate your mastery of the topic area. This does not mean that you quote, paraphrase or summarise everything you see. As a rule of thumb: only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation.

Argument - Finally, keep in mind that when writing you are dealing with a form or argument where you are trying to persuade your reader about some point or other and that should only be attempted when you are knowledgeable, the argument is essential and you have a deep respect for your readers.

5.7.2 Literature Review Construction

Here is a plan that you can use to construct your own review. It is not infallible and will require conscious effort from you and it must be based on a thorough evaluation of the literature.

Step 1. Purpose - the purpose is to fully prepare your mind with all that you need to know about the topic area and the particular element of it that you are focusing on. The idea is that what you write shows your mastery of the topic and in fact you have become an authority on the topic area. So a review is not a long list of quotes, paraphrases and summaries, it is an evaluatory discourse. That is, readers will want to know what YOU have to say based around what you have uncovered in the literature - so readers must see what you have found and see what you have to say about it.

Step 2. Topic and Aspect - Make sure you are clear about your topic area and which particular aspect of it you need to explore and understand in order to be able to effectively carry out your planned research.

Step 3. Select a Theme - Use your project problem definition, target and outcome to guide you in selecting a theme that will connect all the various elements of your review together making it a lucid and progressive discourse. (Don't be afraid to alter the theme as you go along if that becomes necessary)

Step 4. Your own Views - Try to make a list of your own views, ideas and knowledge. Remember, the review is an evaluation of what you find not a recitation of it. If all you do is tell us what you have found you may not even pass because almost anyone can write a review on any subject if all that is required is to more or less recite what has been found. So you must structure the review around your theme and your own ideas and thoughts.

Step 5. Make a Review Content list - Based around your theme make an outline list of things to include and then arrange the list into an order that will take you progressively through the topic area aspects. Commonly it is found that it is useful to start as follows.

5a. Basic definitions and terms that need to be clear for the core topic area. (Be careful to note any abbreviations)

5b. Map out several important areas or problem space dimensions. Now it is impossible to be general here so for example if I were looking at mobile devices and their use in business I might map out the following elements: value, attitude, use, limitations, practice cost, ease of use, learning curve, effectiveness and so on. Please be careful here to look for significant things not just drag in anything and everything. Once you have made this list you may add to it, modify it or discard from it as you go along.

5c. Work out how you want to end the review - often this just sums up your point of view but you may have other ideas

5d. You may like to include some statistics if that is relevant. But don't let this run away with you and so the review just becomes some sort of justification based on statistics. Remember, statistics almost never tell us anything about the topic itself and only tell us things related to the relative importance of certain things we have identified.

Step 6. Literature Searching - Armed with your theme and list of elements now start your search for suitable material but be very careful to record the exact details of where everything may be found and checked. The search may start with the Internet or a special tool like Google Scholar but must move on to respected publications.

Step 7. Structure - The step is to structure what you have found and what you want to say about it so we get a coherent and lucid discourse on your chosen subject area. This is not a trivial matter and you must expect to go over it many, many times before it is really an example of your very best work.

5.7.3 Literature Review Traps and Pitfalls

Most of the things listed below are regarded as due to simple laziness and so are unforgivable in a Master's student or indeed any research student and if you are guilty of them then expect severe punishment in terms of loss of marks or failure overall.

Not a justification - A literature review is NOT a justification for your research idea or problem definition. So filling the review up with various statistics will never be regarded as explaining to the reader the topic area and your evaluation of it.

Statistics - Filing up the review with statistics carries no real value in convincing the markers that you are master of that topic area.

Poor Structure - where the review is little more than a few drafts notes obviously written without much thought. To communicate you must impose some structure on what you write else the readers will not be able to see any progression in your thought or in the topic.

Filling up the review with citations - one after the other with no student input. It is correct and desirable to tell your readers what you have uncovered but unless you make comments and add your own views on what is found the work will be regarded as worthless.

Common knowledge and Obvious - Quoting or paraphrasing material that is either obvious or common knowledge implies that you have not looked at the sources beyond the first page or forward. Here is an example from a project document. "Poston (2000) stated that organisation expected ERP systems to deliver improved performance". This is worthless as it is obvious that they would want this and to say it make no valuable point at all - its no good trying to say things like this as if Poston was enunciating some law of the Universe or a point of huge importance on some new and valuable angle related to ERP - no he is just stating the obvious.

Bad citations style - It is very common unfortunately to see the citation form (Briggs, 2000) placed at the end of a sentence or paragraph. When we see this it can ONLY mean that all you have done is paraphrased, summarised or copied that section. This practice is more or less plagiarism and is representative of a very lazy attitude that assumes that just expressing something in your own words is a valuable contribution - its is not because YOU are saying nothing and what you are supplying is not really your own work at all.

Activity Definition - Some students use the Literature Review to tell us what they are going to do in the research. This will result in a zero mark as what is to be done is covered in the Research Design so repeating it here is valueless. This practice is a certain sign of laziness.

5.7.4 Reference and Bibliography

References are to primary sources that you use in the text of your written work. A bibliography is a list of sources you have identified as useful, including references, but not necessarily used. The University will look very carefully at any references to see if you are prepared for study at Master's level in your chosen topic area. Overall, the expectation is that you will list at least 10 sources. For each source you must consider its:

Currency – looks at publication date and be aware of changes in technology.

Completeness – Make sure you are looking at the final version not some draft or abstract.

Uniqueness – is the source a primary one

Coverage – Use your list of sub-topics to ensure that you cover all the areas required so that you are fully prepared. But make sure that you are not including multiple texts with essentially the same content.

Range – Make sure you have a good range of authors.

Authority – ask is the text authoritative. This can be done by considering the author, publisher, writing style and currency. It is also possible to use citation indexes to see how often the source has been used.

Accuracy – Is the information correct? If you cannot be sure then you must not use it.

Relevance – Make sure that your sources are relevant to your project topic.

Usage - The basic usage strategy is:

Find – Relevant texts using a library index, the internet, online book stores and so on.

Evaluate – Once you find a possible source you must evaluate it for content and relevance.

Contextualise – that is fit this new source into your personal knowledge base.

Cite – If you use a source it must be listed in your reference section and cited in the text correctly.

Discuss – You may include something from a source in your work as a copy (quote), paraphrase or summary but in all cases you must introduce it, comment on it at cite its source.

5.7.5 Evaluating Internet Resources

When using internet resources it pays to be careful and always sceptical because of the following factors:

Anarchy - anyone can publish just about anything on the Internet

Validation - authors do not always have their materials checked by an authoritative third party

Tendentious – when the author wants to convince you of something use any means to do it.

Honesty - authors may not always be what they seem and may assume personas, lie or make false claims

Consider – the motives of those who publishing on the Internet

Trust - in research trust nothing until you have good cause to do so. This is the opposite of what we do in our daily lives in that we tend to trust until we have reason not to

Context – be aware of the context of what you find. For example is it a University site, is it a manufacturer and so on.

Accuracy – this simply mean is the information correct. You need to be aware that information might be validly collected but still be quite inaccurate.

Validity – this simply means that we ask is this a valid source in the sense that it was constructed in a reliable manner. Any lack of information on proof readers, editors and publishers means that mistakes are more prevalent than in print and therefore increased scope for innocent error and for outright deception.

Authority – this means was the author competent to create this material. For example any one could have an interest in say Emotional Intelligence and quite easily create an internet article on that subject but it would not have the same authority as that of a University professor who has spent years researching the topic.

Uniqueness – here we are asking is this an original work (a primary source)

Completeness – this may simply be described as asking if the work is the final and finished version. You need to be very careful here else you might find your self using the material from the earlier part of the work which in fact is augmented later in the work.

Coverage – this means what is the scope and scale of the source. Now this does not mean that a source will cover everything on a given topic but it should be clear as to what it is covering.

5.8 Citation Examples

The following set of examples is intended to show some poor use of citations and also some sound ones. These examples should be studied with care by students so that they may avoid inadvertently fall into the trap of using poor scholarly practices. The quotes are from a range of sources and topics and in your study of them you need to concentrate on the form. Now assume all the following were all written by the Research Methods tutor so the comments will be offered in the first person and he is talking to you

These are just simple examples and they do not imply you must use italic or indenting as that is only used here to show clearly the pieces of work being looked at.

Example 1.

Lyau & Pucel (1995) found a link between training and productivity for their sample of Taiwanese car part manufacturers. Bartel (1994) found that training is a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors. Bishop (1994) and Barron, Black & Lowenstein (1989) both found that training increases management estimates of productivity.

This is poor because I only told you what the cited authors said. I did not introduce the author's words, nor discuss them and it's almost impossible for you to see what point I am making other than the obvious one that productivity and training may be linked – in effect it is not my work at all and there certainly is no sense of evaluation here.

Example 2

It has been found that because Arabic words were written by copyists who did not use vowels that over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that it looks as if I attributed the entire paragraph to Noldeke. So you can have no idea which part of the paragraph was my own thought or maybe none of it was. This is bad practice and some tutors even regard it as blatant plagiarism. The fact is that tutors when they see this form in will automatically assume that all the student has done is paraphrase what he has found and none of it in effect is representative of any student thought and will mark the work down because of it

You can use the bracketed form if you just want what amounts to passing reference to a source as in the following example.

In two recent works (Harding 1986a, p.80; 1986b, p.138) it has been suggested that ...

Example 3

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that "change in organisations is an inevitable consequence of growth" – this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdal is clearly obvious and that by Briggs is common knowledge. Also it is not entirely clear that the second sentence leads logically from the first one. The point is that using citations here was unnecessary and therefore worthless.

Example 4 - Suppose you come across the following in a book by Noldeke. But the bit that interests you is by Frederickson – how will you set about properly using and referencing the Fredricksons quote?

Tools are needed if we are to measure software quality in a meaningful way. The idea of quality, as we know, is intangible since many views are possible. It follows that we must define some terms in order to measure quality. It is useful to note what Fredrickson said: "Definitions of what quantities we need to measure in order to assess software quality are at present arbitrary since as far as we know they have no connection with functionality".

This does not mean that they lack a rationale, but simply that professionals disagree on the definitions themselves and so it follows that

In this case the correct way is to find the Frederickson book and use that because it is the primary source. Quoting from secondary sources will only be tolerated in proven cases where the primary source cannot be found or for other reasons is inaccessible and it must be done in the correct manner as shown in Workbook 8 for secondary sources.

Example 5 – Can you work out what the following extract from a piece of student work is saying – if you can please tell us in simple words

It is argued that tacitness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

The sentences is obviously copied as it is very, very unlikely that any student would write with such academic complexity and obscurity – lines like this are not designed to communicate they are designed to impress the reader not further his understanding. What it in fact it is saying is that some skills are very difficult to duplicate and this may mean that growth may be restricted.

Example 6 – Here is a good example and in this case I paraphrase the idea rather than use quotes. Notice how I: introduce the idea, state the idea and discuss the idea and so I weave into quotations, paraphrases, summaries or whatever my own words and thoughts and evaluations.

There has been a long standing problems with some early Arabic manuscripts in that many words have become obscure and even in context they are still unclear. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowel, over time the meaning of some words became lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use "assonance analysis" to study word endings and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes.

5.9 Literature Reviewing Cautions

Writing a literature review is a difficult and time consuming task if it is to be done well and there are no short cuts to sound scholarly work so here are some final pointers.

Laziness - It is very common to see students write down things in a literature review as they occur to them. This practice might be fine for notes but it is obvious that the way thoughts pop into ones mind or information is discovered is most often anything but logical or structured.

Structure – to communicate in writing the work must have an effective structure that is well planned and allows the theme to develop to it natural conclusion.

Pretence - some students try to be scholarly and pack their work with quotations and paraphrases – this then become not an evaluative review of what was found but a recitation of it instead.

Non Review - some students just write down what they know without any references to the literature – this will always lose you marks as no one will believe that you obtained that information by your own brainpower without any outside assistance.

Experience – students often claim that what they write is all down to experiences but again no one will accept that. They way you use experience is in your evaluation of the sources, comments on them and building up your own arguments.

Inclusion – Preparation of the mind for your topic area does not mean you write down everything you know that might be relevant. What it does mean is being focused on your topic area and becoming expert in that. For example, an Engineering project where the literature review contains page after page devoted to telling the reader about every conceivable life cycle is hopeless and in such cases there is almost no thought over what is written and so it is worthless. Similarly, if a study project was looking at eCommerce as a way of selling drugs then page after page telling us about various drugs, treatments and prescribing practices is worthless in the context of just selling drugs. It's not volume is wanted but considered content.

6. WORKBOOK 6 – MAJOR PROJECT ELEMENTS

This workbook is intended to help students formulate clear project elements but here that what is said here is a mechanical process and it is your responsibility to make sure that what is written down makes sense.

6.1 Scope and Scale

Scope and scale are meant to be considered carefully otherwise a project which is out of control and way beyond your capabilities in the time available may occur. Alternatively, the scope and scale may be set so that the problem becomes trivial and the idea is rejected. So please take note of what these terms mean as far as this course is concerned.

Scope – this means something like selection or choice. So for example, if I were looking at training in desk-top packages I might select just Excel or I might select Excel and Access and so on to focus on. The point is I set my scope by being selective.

Scale – the means something like number or extent. So for example if I set my scope as looking at Excel I now need to set the number of users I will include in my study.

Scope and scale are two dimensions that set a frame around your work to bring it into sharp focus and exclude everything else. You need to put limits on both these dimensions but it is most important is to be clear about scope – that is, what exactly to include in your study, normally, just include ONE significant thing.

6.2 Presenting Problem

In any project it is usual to choose an area of knowledge and practice to be its topical focus. For example, one might choose modern usability issues, automated network management, digital paper and so on. Once one has a topic area like this it is necessary to choose a problem theme within it to be a sharp focus for a primary data research effort. It is best if one problem theme is chosen and its resolution or partial resolution would be of strategic business IT significance. In general, it is not all that easy to give a simple and all embracing definition of the notion of problem but the following has proved to be useful.

A problem or issue is something that is a matter of concern or debate within the topic area and whose resolution might bring benefits. (Checkland 2003)

In practice this means a problem is an object not an activity. For example, stating the problem as "how to ride a bicycle" is incorrect since this is not the problem it's a question about the problem - the problem is "riding a bicycle".

Another difficulty is that students often write down the problem in such a way that it is an answer or solution to the problem. So for example, if one writes a problem statement as "lack of training" then implicitly that is a solution as well. When this happens it is almost certain that the writer is not thinking about the problem at all but is obsessed with a particular solution. In this particular case the real problem might have been "errors in data entry" and one of many possible solutions is training.

6.2.1 Defining the Problem

It is always quite a good idea to construct one's own definition of the problem and to do it in as few words as possible. Notice, that it is your own definition not one you might look up in a book or on the internet (though you might start with that) because there is often little learning value in just copying a definition as far as deepening your own understanding is concerned.

Remember, that any definition one constructs will not be absolute and universally accepted by everyone - but in research this is not a problem as long as the researcher makes it clear what particular definition is being taken. Do not take this process too far and end up with either over-complicated or trivial definitions - they must be thoughtful and comprehensive. So it is recommended you start by thinking about four things where the acronym CAPE is used:

Characteristics – observable features or facets of the problem idea,

Associations – every problem will have links to other situation elements,

Perspective – when a problem is encountered it will always be from a certain perspective

Effects – say what effects ensue in the real world if the problem is not resolved.

6.2.2 Defining the Problem - Example

Let us suppose that a student has identified the problem theme as Phishing. Naturally, the student will be concerned that this is a good idea and would like confirmation of that before expending time on it. One can

ask the course tutor, but he/she is not expert in everything so at best one would only get an opinion as a response so how should a researcher proceed. So for Phishing a researcher might note the following:

Characteristics: illegal, intrusive, upsetting, preys on those who trust their fellow man, etc

Associations: email, chat, file sharing, etc.

Perspective: management (but try to look at it from several perspectives as well)

Effects: destroys confidences in the system, may lead to personal or company losses etc

Normally, it takes quite a few attempts before a definition that is lucid and comprehensive is obtained. Remember, the definition must also be useful within your research study – that is, it's no good having a well formed definition that does not offer a sound basis for a research effort.

Now here is a first attempt

In the modern world email is a technology that almost everyone uses whether in the home, at work, on the move and indeed it seems to follow one around. Typically, email is a simple one-to-one message passing technology but it is now offered with enhancements that include voice, video, chat, file passing, file sharing where suppliers are attempting to present a complete communication environments. With such a technology come problems and one such problem is identity theft and one way of getting this is known as Phishing. In its simple form an unknown, but apparently authentic, source asks for personal details and then uses them for fraudulent purposes. The problem is identity theft using email systems where a message poses as a legitimate requestor in order to fool the recipient into thinking it is legitimate request. The problem in computer system is known as Phishing.

Here is a final attempt (but most often there are several intermediate attempts)

Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as legitimate request. The intention therefore is to fool the recipient of the message into releasing information which can subsequently be used for fraudulent purposes.

6.2.3 Cautions on Problem Definition

The acronym CAPE is just an aid to formulating a definition so one should not worry whether something is a characteristic or an effect - that does not matter very much because the whole idea is to uncover problem aspects and expand one's understanding of the problem theme.

As a very rough guide one often finds that the final definition must come down to about a third of what we start with. In most cases if one is familiar with the subject it is possible to create a good definition in about 1 to 2 hours and then if necessary update it as your project progresses as it is almost certain that there are elements that have been missed or imperfectly understood.

6.2.4 Problem Size

It is hard to measure the "size" of a problem because there is no scale on which to gauge it. But one can look at two aspects to get some idea.

Current Effects – think about the effects of the existing problem and try to assess their seriousness in terms of the context in which it is set. In simple terms just ask "is it worth solving".

Form of Answer – perhaps a better guide is to think about the form of answer and see how extensive, important and how hard it is to get. For example: one student wanted to deal with password overload – a clear problem with which we are all familiar but his outcome was a set of guidelines on how to construct good passwords but in my view that was a trivial answer to the problem because those guidelines can be found almost anywhere and it is doubtful if that goes anywhere to solving the overload problem.

6.3 Project Target

When you think of a problem you normally do it in relation to its effects. It follows that you have to think very early in a project about what effects will be generated if you can resolve the problem – these real world effects are called the project target. Normally one settles on one major target although it is permissible to list more than one. Targets are effects so these are typically introduced by a verb form (increase, reduce, remove, reduce etc) and tend to be such things as: improved accuracy in data entry, to gain infrastructure resilience, streamlined workflow and so on.

6.4 Project Outcome

It is obvious that at the start of a project we do not have its outcome – but we can have some idea what its form may be. Therefore if we know our target we can speculate about what could be generated as a project outcome that might generate or go some way to generating the desirable target. It follows that whatever we

decide is the form of outcome we are looking for in the MSc project it must credibly be able to generate the stated target. Outcomes are objects and so are typically expressed as nouns: Here are some examples:

The target of “improved accuracy in data entry” might be generated by a project outcome of a training needs assessment report or a training plan.

The target is “to gain infrastructure resilience” might be generated by a project outcome of a revised backbone design or a set of recommendations for new technology.

6.5 Problem, Theory (Speculation) and Form

It is often useful when thinking about the solution to a problem theme to think of it as based around or generated by some personal theory a person holds about that problem and its setting. Essentially, one gets at this theory by speculating about causes and possible solutions routes. It is not easy to say how to speculate but it can be said that it is aided by a thorough literature review, personal experience and a deep consideration of the problem theme perceived in a given situation.

For example suppose the situation was related to issues with application software implementations in business not being as successful as expected. Recognition of this problem theme is a first step but if one is to do something about it, it might be useful to thoughtfully speculate on why success is lacking in this area. It follows that one might speculate that this lack of implementation success is due to poor implementation strategies, or poor user training, or poor project management or any number of things. Notice that there will always be rival speculative ideas and that is why one must be thorough in looking at the literature and using your basic knowledge and experience to open up the situation in order to at least have a credible theory as to the most probable solution route otherwise one might just waste time on chasing nothing of value.

Do not let this idea run away – this is not about natural laws of the universe such as Ohms law or Archimedes Principle – here one tries to establish a personal belief about a situation and its problem theme. So after speculation one might express ones personal theory about the above example as follows.

It is believed that implementation of application software is proving difficult and this may be due to poor implementation strategies. It follows that if this is the case and better strategies can be defined then implementations may prove more useful in the future.

Notice that my theory points to a particular form of answer to this problem theme and in this case it is related to perhaps a document that explains how to formulate implementation strategies based on a consideration of user needs, application intention and business objectives.

Occasionally, the theory may be embodied in a scientifically constructed hypothesis but more often than not in technological research it is expressed informally as an idea.

6.6 Primary Data

Primary Data is data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

6.6.1 Primary Data Collection Protocol

Within every project there has to be a collection protocol for the practical collection of the primary data. Every complete protocol will have 5 features:

Vehicle – this is the primary mechanism or technique employed by the researcher, typical examples are: interview, questionnaire, observation, role playing, seminar, focus groups, document searching and so on

Recording Profile – this describes how the data will be physically recorded. Typically we might use: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria –this is a profile that allows the researcher to know that he/she has a valid sample point from which data is to be collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. If we do not have a profile we may not have any consistency in our data and it may therefore be meaningless.

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable.

6.6.2 Project Purpose in a Nutshell

Students sometimes get confused over what a Master's project is about. Consider a topic area like Digital Paper which is likely to be a very hot technology in 2006/7. A Master's project is not about producing a long narrative on Digital Paper explaining what it is, how it is used and what the technological infrastructure to support it might be. A Master's project is about identifying a problem theme in Digital Paper and then collecting and processing primary data into a form that helps you resolve that problem theme based on ones own personal theory. With this in mind, consider the following examples.

Example 1. Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them – is that primary data and is this a valid research purpose? No because in the first place one might just regard the manual as listing the functions anyway so in effect the data already exists, secondly, this is just one book and so its content might be complex, trivial or totally unrepresentative.

Example 2. So if I extract (my basic activity) instances of phishing (my problem theme) from an email log that would be primary data because even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data) as a collection did not. My purpose being to process this collection of primary data to find out the most common sources of phishing and express my findings in an evaluatory report (my form of answer).

Example 3. If I conduct interviews in order to describe (my basic activity) a user purpose regarding illegal downloads (my problem theme) in my company with selected employees the interview transcripts are my raw primary data because the transcripts did not exist before the interviews took place. My purpose being to process this collection of primary data in order to develop a policy (my form of answer) to control illegal downloading activity.

Example 4. If I look through written reports (secondary data) on security violations (my problem theme) for a particular company with a view to identifying (my basic activity) the root cause of each violation then even though the violation reports exist the list of root causes (my primary data) did not so it is primary data. My purpose being to process that collection of primary data to create a strategy (my form of answer) that will alleviate or remove certain kinds of violation in future.

Example 5. If I plan to build an application for processing student MSc marks (my problem theme) then I need to ascertain (my basic activity) the system requirements (my primary data). My purpose being to process this collection of primary data to create a design (my form of answer) for the marks processing system.

6.6.3 Pre-processing Primary Raw Data

In many cases it will be necessary to process the raw data that one collects into a structured form of some kind so that is easier to use when generating the final project outcome. For example, if we have a series of interview transcripts it is obvious, that in that form, they are not easy to use so we might perform a pre-processing phase to get the core data into more structured form that then constitutes our primary data collection before the main processing phase that generates my project outcome is carried out. For example, suppose I examine company documents on misuse of IT system resources by employees. In this case I might proceed in two ways to get my structured primary data collection.

In line processing – that is I define my structure before I start and then as I come across a misuse example I structure it there and then. However, the disadvantage here is that you have to continually look back to see that you are not recoding the same data again and again from other incidents and so it tends to disrupt the collection process and make it longer to complete.

Pre-processing – here I wait until I have been through all the documents and then I use my set of notes to systematically work through the whole raw collection and form my structured collection that way.

6.7 Writing a Research Question (Study Projects)

This is intended to relate to the core problem that your research is trying to resolve. Make sure it is a clear question. Ideally one wants an open question: that is one that does not just end with a yes or no answer. This is often quite difficult to achieve but it can be done if you work at it.

A question is an expressions normally used to request information the form of an answer. Questions can sometimes be like commands used to elicit a response and others such as "Would you pass the salt?" looks like a question but in fact is a request or action, not for an answer. In Research Methods, however we will only look for questions that elicit information.

The simplest questions implicitly or explicitly request information from a range (finite or infinite) of alternatives and these are often called bi-polar questions. An interrogative word is a word used to start a question. In English the following is a list of interrogative words although some of them are rather old fashioned now.

Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.

6.7.1 Questions that are not Questions

It is often difficult to write something that in English could be taken as a question. Now I am sure that in daily life everyone knows how to ask a question but when you write something down you are entering another world. Consider the following two lines – would they be understood as proper questions?

How to sharpen a pencil? Or What a pencil can do for you as a student?

Now these clearly ask for information but if you spoke these fragments to someone they would not quite see it as a proper question – in English such fragments would be understood as a kind of heading to a list of instructions for sharpening a pencil or a list of the benefits of using a pencil.

6.7.2 Basic Research Question forms

It is best when attempting to construct a question to think about what sort of answer is to be expected – now in normal everyday life we do this instinctively. For example, you would not say "is this the right way to Pablo's restaurant" if you wanted actual directions because that question form could only give you a Y/N answer. Instead you would probably say something like "how do I get to Pablo's restaurant from here" and reasonably you would expect an explanation to that question. Broadly speaking there are four sorts of answer:

Bi-polar answers - Essentially questions that imply a limited range of possible answers. Typically, a bi-polar question starts with a word such as WHAT, IS, CAN or DOES.

Is it possible to sharpen this pencil? (Y/N)
Does it make sense to allow children to sharpen pencils (Y/N)
Can a blue pencil be sharpened easily (Y/N)
What is the correct pencil weight for drawing a picture? (HB1, HB2 etc)
What is the common view of staff about using blue pencils? (Disagree, agree, etc)

Bi-polar questions can of course be useful but more often that not they have no great utility and the answer is obviously yes or no. Consider the question: "Can a green pencil be used in place of a red one?" Well of course it "can" be used so the answer is bound to be YES and so the question is pointless. Sadly, questions in this form occur all too frequently in student work and whoever writes such questions is not thinking at all about what information he/she want to elicit.

Explanatory answers – where the expected answer is an explanation and it is often in the form of a procedure or process. Typically, explanatory questions that start with 'HOW' or 'WHY'. For example, "How can a pencil be sharpened safely by young children?"

Descriptive answers – where the expected form of answer is a description most often in the form of an evaluation. Typically, these questions start with WHAT or WHY. For example, "What is the purpose of HB0 pencils?" (a simple explanation) or "Why are HB0 pencils difficult to sharpen?" (an evaluation)

Exploratory answers – where the expected form of answer implies an answer as an exploration of something. Typically, exploratory questions start with HOW or WHY. For example, "How should we use HB1 pencils best in drawing figures?" (often an exploration is needed here leading to an explanation)

Good interrogative words to start questions are: what, where, would, in what way, can, is it, why, which, where, how, does, who, why, do, etc – whatever word you use always ask what form of answer is implied by each of them. You must be sure that whatever form you decide on as answer that you can actually construct it and when it is constructed as part of your research it is in fact useful strategically in some way.

For example, suppose I decide that the form of answer I want is “The role of technological innovation is business success”. Well the task you now have is to now ask yourself whether you know how to express a role (write it down if you like) and whether knowing about this role will be of any use.

6.7.3 Research Question – Why are we asking it?

In normal everyday life questions come at us more or less all the time. Sometime we just answer them but more often that not we have a tendency to ask “why do you want to know”? It is therefore always useful when setting out your research question to ask why you asking it. That is you say to yourself, if I have the answer to this question then there will be some good outcome because of it. Sometimes we embed in our questions why we are asking them but mostly we do not. You will see later however, that you will have to make the reason plain in the aim so one might as well think it through at the question stage as well.

6.7.4 Research Question Form of Answer

For any Research Question there will always be several possible forms of answer arising out of ones personal theory about a problem situation encapsulated in the question. Ideally one would like the research question to be worded so that ONLY one form answer is possible and that is the one our theory suggested but often that is not easy to do so one normally has a range of options and competing theories to choose from so one looks for a form that interests you or looks to have the most utility. Do not be tempted to have multiple questions all in one sentence or look for multiple answers since it is better to focus on one significant output form. Table 4 lists the main forms of answer to help you when considering your personal theory.

Category	Typical Interrogatives	Expected Forms
Bi-polar	does, is, are, what, when or can	A list of possibilities
Explanations	how, why, who or where	A report, a model, an equation, a theory, a design, an evaluation etc
Explorations	How, who or what	A list, explanation, a comparison matrix, a pattern, a survey report, a theory etc
Descriptions	What, who or why	A report, a process or procedure, a model, a policy, a strategy, a theory etc
Table 5. Research Question Outcome Possibilities		

6.7.5 Strategy for formulating a Research Question

There is no easy way to do this and no real templates for it either so a good formulation will require some clear thinking and effort. What follows is a typical structure that you might use, but do not feel limited by it, and neither should you worry too much about the order in which you present the following elements although it would be very odd not to have the interrogative at the beginning (**SPITS** for short)

Spotlight – try to put the spotlight on where the primary data or information needed to answer the question might help come from.

Problem – this is about focusing on a single problem, so try to be as concise as you can.

Interrogative – what is your key interrogative word (how, why, what etc). You should note that some interrogatives need to use two words if a proper question is to be formed. For example, “how” on its own will not normally make a question but when you say “how can..” it is clearly a question.

Target – think about what will happen in the real world if you can resolve the problem. For example, it might be your target was to gain efficiency improvements, provide or enable better communication, increased accuracy and so on. It is also possible, but usually unwise, to state the target negatively if this makes the wording of the question more natural and you will see examples of this in section 6.7.

Suggestion – here one thinks about the problem theme and simply asks what sort of answer and what form it might take. So sort of answer might be yes/no, an explanation, an exploration, a description and these sorts of answer might be expressed at the end of the project as a report, a model, a list and so on.

Here is a good example from student work - "How can the billing cycle time be reduced by identifying and defining best practice in order to improve the quality of response to customers by reviewing the initial accounting processes stages?" Notice here that we have:

Interrogative = what, **Problem** - billing cycle time, **Target** – improved response to customers and **Spotlight** – initial accounting process and **Suggestion** – a best practice portfolio.

It is not always useful to add in the data spotlight because sometimes it can limit ones speculation about causes and solutions and in any case, the spotlight is often implicit in the problem definition. It is also possible and permitted to add in what form of answer you expect to the question but normally I would advise against that in most cases and this is discussed in the next section.

6.7.6 Function of a Research Question

The function of the research question is to crystallise the problem and desired effect (target) of any solution. But doing this is only useful if it allows the research enough room to theorise or speculate about possible answers so that indeed the solution space can be explored. Consider the following formulation:

"What factors influences the development of sound IT project management working relationships?"

Here we have in a solution because we are told that the problem is "working relationships" and what we want as a target is sound working relationships. But we in effect we are told to look for factors and so the solution to this problem theme will be a list of factors. The trouble with doing this is that it cuts off any further speculation about dealing with this problem idea and so the question becomes rather pointless.

6.7.7 Meaning in a Research Question

This section has looked at the structure of a typical Research Question but that is all it is and students must not treat it as some sort of template – it **MUST** be thought out step by step and even then one has to think does it make any sense, is it a focused question, what sort of answer should I expect and so on – there is simply no substitute for careful thinking.

Once you have formulated your research question and have a good idea what form the answer will take then its time to test it using the following ideas. Now be aware that this is just a test of structure and of itself it does not mean the question makes sense – there is no way to do that other than using your own brainpower and common sense – if it makes sense to you it will probably make sense to whoever else looks at it.

English – does it read correctly in English as a question?

Paraphrase – if it's a good question you may be able to ask it in several different ways – so try to do that until you get a formulation you are happy with.

Bi-polar – this means that the question has a fixed and limited range of answers such as "Y/N", "bad", "good", and "excellent". This type of question can of course be useful but the problem with them is that such answers do not have much utility – that is they do not tell you anything of value in terms of what action or actions you might take. You are advised to avoid such questions for your project.

Discussion – look at your question and honestly ask 'will this question produce discussion?' – what this means is to ask 'who am I writing this question for and would it interest them'. Try not to think that you are doing this for your Research Methods tutor but try to think what you would do if you were trying to get funding for research to get an answer to the question from someone.

Answer Form – try to work out what form or forms the answer will take (typically: bi-polar, explanation, description or an exploration) – if you try to avoid this aspect you may find yourself in serious trouble with your research.

6.7.8 Common Errors in Research Questions

The following are typical errors found in student written Research Questions – they can all be avoided if one takes just a minute to think through what has been asked and what sort of answer is likely.

Not a Question - to an English speaker the following would not sound like a question, instead it would sound like a heading to a list of instructions or a procedure. "How to make business application development productive at XYZ Corporation?"

Multiple Questions – It is never a good idea to try to put TWO (or more) questions into one as in the following example - one is about testing and one is about bugs they are quite different things. "How can software bugs be minimised and the testing cycle shortened in the development process of an Inventory System?"

Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example and it is easy to see that the answer to the question is bound to be YES - of course a productive work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this. Similarly, it is easy to explain how a better development process can increase productivity.

"How can a better business application development process increase the productivity at XYZ?" or

"Can a productive work-life balance be achieved with telecommuting for technical personnel?"

Please remember that it is possible to write a very poor question that exhibits more than just one error type. Again, there is simply no substitute for thinking about what it is you have written.

6.8 Primary Data Generation with BAGeD

Based on a problem theme, theory and the form of the project outcome expected one needs to formulate a process to create a unified collection of primary data. There is no algorithm for doing this and one has to go carefully through the steps: define the data (BAGeD), locate the data and decide on a protocol to collect that data reliably.

Spotlight - The core of this primary data generation process is to find an activity whose execution effectively points to the right data so that you can formulate the whole collection plan around that activity. This core activity is called a Basic Activity for Generating Data (acronym BAGeD) and is the activity that one performs to generate the primary data that you want. Think of the BAGeD as a sort of spotlight that is focused just on the primary data that one needs and nothing else. That is the spotlight illuminates the data that you want in the sense it tells you how to generate primary data items but not how to actually collect that data.

With a BAGeD it is ideal if you can find just one verb to describe the activity. One needs to be careful here that the activity is clear since almost all verbs need to be qualified or supported by stating what the object of the activity is. For example, if I were to say, "look at fault logs for my primary data" then that is very indistinct because it does not tell us what to look for (the object of the looking). But if I say, "look at fault logs to describe instances of SPAM attacks" then I now have a more distinct activity because I know what I am going to write down as my primary data. The whole primary data collection process is then fitted around the BAGeD and the detailed planning to get the necessary data can then be made.

Example - suppose the problem theme is the value of training. Clearly a lot of money is spent on training so it might be really useful to know if there is a link between it and productivity. Suppose we speculate that the link is to do with essential business working practices and these change over time to meet new needs so that what I need is an answer in the form of a process model on how one identifies changes in business essential working practices and links them to a training initiative.

Now that I have my theory and form of answer (a process model) the Basic Activity for Generating Data can become **describe changes in essential working practices** of key operational staff – thus, my Basic Activity is "**describe**" and the Primary Data will be **changes in essential working practices**. In practice you might try several ideas before you are happy with one. Now I have this core activity I can work out the full process of getting to the data and processing the resultant collection to get my process model (outcome) that describes the link between business essential working practices and training.

Once the BAGeD is clear it, is an easy step to say how that data will be collected. In the above example I might use interviews with relevant staff. In summary the whole process becomes **describe changes in essential working practices** (BAGeD) using **interviewing** (collection protocol) with relevant staff.

6.9 Getting a BAGeD

The Basic Activity for Generating Data (BAGeD) then is an idea that allows you to spotlight exactly the data that you want. So we are looking for an activity and we hope that activity will shine a spotlight on the data. There are only three real considerations:

Problem Area Expertise – it is obvious that you need to have gained expert knowledge in the topic area and in the particular aspect related to the problem theme you are dealing with. In general, depending on the topic, this might include things such as: knowledge of the technology, management and usage processes. Unless you have thoroughly prepared by using literature reviews and/or other means you will simply not be in a position to know enough to be able to decide competently what data it is possible to collect.

Intended Outcome – fix in your mind what your Research Design is trying to generate as an outcome. With the above in mind, recall that whatever data you collect will be first formed into a structured primary data collection during the pre-processing phase, which follows immediately after collection, and then that structured collection will be used to generate your outcome.

Let us suppose the outcome is to be a set of guidelines, so you have to think what sort of primary data is needed to be able to generate the guidelines. This means you must know what guideline means and how one is constructed and that is where secondary data comes in. So in this case you might look at text books or journal articles to find a guideline model to use. Additionally, you would look at examples as well as look at any relevant company or international standards.

Collection Protocol – the last thing to consider is can the data be collected and if it so, what is the best way to do that. So it's not a matter of just choosing anything that comes to hand, it is a serious practical consideration based on a thorough and logical analysis of the sort of primary data that you want.

In the guidelines example above, the idea might be to use a questionnaire and one has to ask would a questionnaire allow for the collection of the data I needed. Let us suppose that the data we spotlight is: IT media and usage. Now it's obvious that a questionnaire can easily get media data but it is not clear how it could capture usage data so I might decide to get that information by interview instead because I want a much richer picture there. The point is that guidelines are largely about usage so that is where I must direct my effort.

To elaborate, usage is a complex issue and if you try to get it with a questionnaire you are going to have to have a very good idea what the usage processes are and so it may miss lots of things that are going on in the company setting. Whereas, if I use an interview, I have much more opportunity to explore the usage idea and that is what I really want.

6.10 Research Question, Form of Answer and BAGeD Examples

Consider the following further examples which focus on the BAGeD (your data spotlight) and linking it with some theorising or speculation about an expected form of answer. In each case several possible forms of answer are listed but in a research study only one would be chosen for further work.

One needs to be careful – this all sounds fine, even clever but a researcher must seriously consider if a complete process built around the BAGeD can be formulated in order to get at the necessary data within the time and other resources that are available.

RQ = What limits investment into e-applications for SMEs in Hong Kong leading to a loss of competitiveness?

- A list and description of investment constraints or
- A strategy to deal with the investment constraints or
- A feasibility report on e-application implementation or
- A post implementation review report or
- A prediction reacted to the effects of the constraints

Let us suppose that I choose a list and description as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on reviewing investment plans and the corresponding strategic plan in order to identify (Basic Activity) the possibility of an investment constraint (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect investment and strategic plans (secondary data) and by a process of review I identify and extract key investment decisions in the investment plan linked to a strategic plan. So my primary data will consist of a list of identified investment constraints, which I will need to explain.

RQ = How can IT operational criticality be monitored and controlled in order to build effective business systems?

- A process of data criticality categorisations or
- A user guide to data criticality or
- A DRP/BCP policy document or
- A report explaining how data and criticality are related

Let us suppose that I choose a DRP/BCP policy document my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on listing data categories and using these categories I review reported critical incidents related to data categories in order to match (Basic Activity) the category to the criticality of the incident (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect category data (secondary since they must exist in this case) and collect incident reports (secondary data) and by a process of evaluation of each report extract incident details and categorise them (my primary data). So my primary data will consist of a list of categorised critical incidents.

RQ = How can supply chain logistics be improved to provide continuity in manufacturing systems?

- A evaluation of a modern supply change process or
- A feasibility report on RFID or
- An implementation plan for RFID or
- A model that shows how improvements may be made using RFID

Let us suppose that I choose a list of implied benefits all explained as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on describing (Basic Activity) supply chain tracking problem themes (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify tracking problem themes and by process of evaluation of each problem theme I analyse how RFID might alleviate that problem theme. In essence I extract key reported problem themes and possibly categorise them (my primary data). So my primary data will consist of a list of categorised problem themes in supply chain tracking.

RQ = How can an improved personal communication protocols be established leading to productivity and business success?

- A feasibility study on IM and its use in offices or
- The definition of a training programme or
- A series of factors that must be in place before IM adoption or
- A cost/benefits report or
- The design of a regular monitoring scheme to assess effectiveness

Let us suppose that I choose a cost/benefit report as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on analysing (Basic Activity) call content with regard to costs (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify the sort or calls and then extract the cost (easy) and assess the benefit (hard) and by process of evaluation arrive at my report. So my primary data will consist of a list of calls and their associated cost and benefit.

6.11 Writing an Hypothesis

This matches with your research question and amounts to you saying what you think to be true in a given situation. It is in essence an extension of your form of answer where you try to say not only the form but what you think the answer will actually be. When you do this your work then become a process whereby you try to show that your hypothesis is valid. It is quite difficult to write a suitable hypothesis. There are three stages: firstly write the null hypothesis, secondly write the alternative hypothesis and lastly write down the dependant and independent variables. Unfortunately many new researchers seem unable to do these things satisfactorily. Let me illustrate.

A student wanted to write a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (Dependent). Now this will ONLY makes sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified. Now in research people tend to treat the idea of hypothesis in two ways and the second way is often quite valuable in many research situations.

6.11.1 Formal Experiment

To set up a formal experiment one creates or identifies two samples: one exposed to some effect and one not. For example, suppose I were looking at whether a new diet called lose-weight-quick worked or not. I could set it up a hypothesis and look for samples where some people were exposed to the new diet and some were who were not. The experiment then amounts to seeing if there is any significant difference between these two samples. (See notes for how to set up a formal hypothesis)

In a sense we are trying to prove the diet works but that notion of proof needs very careful understanding. The point is that it is very likely that the diet will work for many in the sample and not work for others. So our proof carries a qualification which is that all we could reasonably say at the end is that the diet is likely to work for a large number of people (or not as the case may be). A second point is that we do not usually do thousands of similar experiments and so at best our results for a limited sample would be tentative. Notice that this outcome is quite different from an experiment that sets out to verify a natural law like Archimedes principle or Ohms law where the amount of variety is much, much less and of course such natural laws have been tested many thousands of times so we are assured of their validity.

6.11.2 Informal Idea

Instead we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies to demonstrate this. Notice that we are NOT proving anything here only suggesting that something may be true.

6.12 Writing an Aim and Objectives

For each project we want one overall aim and a set of objectives that collectively will generate the form of answer that has been defined (project outcome). An aim/objective is expressed as an activity to get to a defined and measurable outcome within the scope of the project. The essential difference is that the aim expresses the target (or purpose) for the whole project outcome whilst objectives perform the same function within the project itself. Every time you write an aim or and objective you have to ask three main things with the abbreviation JOB – so when you write an aim or objective make sure you do a good JOB of it.

Can Justify – this really amounts to asking if the aim/objective make sense in that it generates a minor project outcome within a particular aim.

Can Observe - Make sure than someone else can observe or check what you have done, normally this means you can document it in some way (in words, diagrams, charts, graphs etc) in your project document. For Engineering projects this also means that the application is visible to all markers.

Can Build - Make sure that YOU can build the outcome stated.

6.12.1 Project Aim

This derives from the project problem definition and is best thought of as expressing the overall activity and intention of the project to generate an outcome that can be placed in the project document or made easily visible to the examiners. It has a number of elements as follows although when you write your aim you do not have to do it in the same sequences as expressed here and you may write it in any way that best captures your ideas although doing it in this sequence tends to be more logical.

You will note in the aim structure that follows that the problem theme is not explicitly mentioned and we infer what it is by looking at the target. The reason it is not included explicitly is that when one does one tends to get very awkward constructions linking problem and target so we might see absurdities such as “to improve website accessibility because web site accessibility is problematic”. The structure of a good aim is as follows where we can use the acronym ASOT to remember it.

Activity – what must be done with the available data to get the project outcome? Ideally, look for a single activity that sums up the whole project process for generating the intended outcome.

Spotlight – where will the basic data used by the activity come from?

Outcome – this element says how the project outcome will be expressed knowing that this outcome will later be used to generate the real world target. If the Research Question expects a model as an answer then the aim must have the same form of generating the model. Similarly, if the application description states a system to do X then the aim must have the intention of generating system X.

Target – what is the real world intention? That is the project outcome should be useful in the sense that it addresses the real world problem theme on which the project is based.

Aim – to create a website structure design using cascading style sheets in order that it might be used in design to improve web site accessibility.

Activity = create, **Spotlight** = cascading style sheets, **outcome** = web site structure design and

Target = to improve accessibility.

Sample Aim 1 – “To create an improved network infrastructure”. This is unsatisfactory because we have no target - we know that there will be an improved infrastructure but we don't know what effects that will have. So is improved infrastructure the outcome – it cannot be because it would imply sending to Portsmouth for marking some object called “improved infrastructure” and that is an absurdity. So here we have no target and no outcome and we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

So if I just use the above example it would be possible to have a target of a reduced network down time because of the Improved network infrastructure but that could ONLY happen after the project completes and in the project one could generate an infrastructure design - now that can be completed within the project period and later used to build the infrastructure which can then be used to generate our reduced network down time. Another factor here is that we cannot measure whether something called improved network infrastructure (what scale would we use?) has been achieved unless we have a target such as reduced down time which of course we can measure.

Sample Aim 2 – “To build a Wi-Fi implementation strategy”. This is unsatisfactory because although we know the project outcome is an implementation strategy we do not know what value it has in the real world because we have no target. Notice also we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

6.12.2 Project Objectives

The aim expresses the overall outcome for the project but to get there we normally have to pass through a number of minor outcomes on the way and these are expressed as being generated by objectives. For example, an objective that sets out to build a model of the software construction process could easily be a minor outcome for a project dealing with the construction of web sites but could also stand on its own in the sense that is a useful outcome whether the project is completed or not. Conversely the design of a set of interview questions is most likely not to be an objective but a simple project task since it is something that needs to be done but only has meaning within the project.

Since we are looking for minor project outcomes that collectively deliver the project outcome we have a little problem here because any project is made up of a series of tasks, some of which will generate a minor project outcome and some will not. For example project tasks range from preparing the contents list to evaluating the project outcome. A possible rule for deciding if a task leads to an objective is:

Ask is the object produced by the task something that could stand on its own outside the project and in that sense valuable in its own right?

If the answer to the first is “Yes” then it is likely to be a task that leads to an objective. Please take care; this is just a “rule of thumb” so look for things as minor outcome that are real milestones to getting the project finished. It may be useful to think of the project as a pyramid where the final project outcome is at the top and below it are layers that have been generated progressively from objective minor outcomes so that we eventually get to the top.

The format for an objective is much the same as for an aim but with no target and two added features in that they must be progressive and bounded. There is only one aim but there may be from 3 to 6 objectives that show a progression that leads us to the overall project outcome.

Progressive – objectives must build sequentially so that collectively they amount to reaching the aim.

Activity – Ideally we look for a single activity that will generate a minor project outcome that can be expressed in a form that can appear in the project document

Spotlight – what is the data area focus of the objective's activity?

Outcome – In this element you say how the outcome of your objective will be expressed knowing that this must be in a form that can be written into the project document.

Bounded - objective outcomes must be achieved and available within the project period and must not refer to anything that might occur after the project document is completed and submitted

Example – To model and document the software development process.

Activity = model, **Spotlight** = software development process, **Outcome** = a document, Bounded – yes we can do this activity within the project period (in this case we cannot show progression as that only applies to the complete collection of objectives)

It is easy to become completely muddled with objectives and one source of this muddle is the distinction between a project objective: one about what a student can do and evidence in the project document and operational ones: those that have some real world effect that might happen after the project has been completed. In simple terms if you set an objective in your project it must be completed within the projects time scale. Let us just take an aim and look at some possible objectives.

Aim = To report on how the bicycle is an aid to mobility in a modern urban environment

Sample Objective 1 – “To list in a report the components of a modern bicycle”. This is fine since clearly it is something that you can do and evidence in a project document so somebody else could check what you have done.

Sample Objective 2 – “To describe how a bicycle functions”. This is no good since although it is clear that you can develop a description, no one can check it unless you write it down. Better to say “To describe by means of annotated diagrams how a bicycle functions”

Sample Objective 3 – “To understand how a bicycle helps urban workers”. This is no good because although you can do it no one else can check it. Better to say, “To prepare a report explaining how urban workers could be helped by the use of a bicycle”.

Sample Objective 4 - “To ensure that workers get to their office on time by using a bicycle”. This is no good because you cannot do it and if you cannot do it no one can check what you have done. It also sounds more like an aim than an objective because it hints at a target. Better to say “To report on bicycle usage strategies that might be applied by urban workers to ensure they get to work on time”.

Sample Objective 5 – “To implement a bicycle repair system”. This is no good since you can clearly do it but it cannot be checked in your project document. But you could say “Report on the implementation of a bicycle repair system” or “Produce a design document for the creation of a bicycle repair centre”.

Sample Objective 6 – “To ensure that bicycles conform to BS 7898”. This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written “To prepare a report showing how a bicycle can be evaluated for BS 7898 compliance”.

6.13 Words needing care in Aims, Objectives or Research Questions

The key thing is to look at the main verb (activity) you are using and ask ‘does it tell me what to do as a practice’, if not then its use is suspect. A good way to assess if the verb is strong enough is to connect it with an outcome. So we might write ‘Create a framework...’ – here we have the activity ‘create’ and the ‘outcome a ‘framework’ and it is easy to see that it can be done.

6.14 Writing a Title

The title is the name of your project – rather like the name of a novel, something that catches a potential reader’s attention but just gives a hint as to what the work is all about. Think of it as a kind of nickname or slogan for your project and as such it is not a good idea to try to use the same set of words for the title, Research Question and aim. Titles typically have two elements:

Aspect – this is the particular focused area of you study

Why – this says why it might be a useful aspect

Mentioning the means by which you solved your problem should only be included in the title if it is crucially important. As an example, suppose your project was concerned with the development of a database and you used Microsoft Access. Unless your project compared your product with a similar database implemented in Oracle, say, then the tool you used to solve the problem is not as important as the problem you set out to solve.

Be careful with titles, there is a tendency to use the title to say what you will do. The purpose of the title is to give a concise name to what you do. Avoid noise words or phrases such as: “A report into...” (redundant: of course it is a report!) or words like “study”, “investigation”, “enquiry” and “development” are often similarly just noise. It is also usually very unwise to express the title of your project as a question although a title in the form of a proposition is often quite useful as in example 1 below. Here are some examples of good titles:

Planar Similarity – A Possible Software Quality Measure
Heuristics in the Stages of Soft Systems Methodology
A Taxonomy of Heuristic Problem Solving

7. WORKBOOK 7 – BASIC RESEARCH METHODS CHECKLIST

In research we are usually trying to do one or more of the following: understand something, explore something, describe something, explain something, improve something, build something or prove something. To do any of the above, you will have to decide what data you want to collect and choose rationally a research method as your primary research vehicle and build a research design around it.

You need to exercise care here so as not to become confused between a Research Method, which is a framework or model for the whole research project, and Data Collection Protocols, which are vehicles for actually collecting the primary data and might include such things as interview, observation, questionnaire, seminar or role playing.

What follows is just a summary of the methods and further information can be found in the associate project notes and there are many books available on each of the methods listed below. There are many research methods but the list below presents the major ones.

7.1 Research Styles

This is a practical notion and you would be wise to think project ideas through in terms of these styles. There is no sense that one or other is superior and no reason why both should not be applied at the same time.

Quantitative – a style that represents information in numerical form. The numerical form might be graphs and statistics which can be used to show trends, comparison and similarities and the graphs might lead to equations which link variables or allow one to make generalisations.

The advantage of quantitative data is that there is solid evidence that can be permuted in a variety of ways to support or not support a contention. In general, one is counting the frequency of some event – say the number of times the user selects the wrong icon but, and it's a big but, the data is only truly valid in the context in which it was collected so one needs extreme care if we want to generalise.

Qualitative – is typically used to analyse how certain actions occur not just how often they occur. The information is usually represented in textual form of some kind as a description of some observable event or events. The usefulness of this is that it exposes the thought processes or reasoning behind a particular behaviour – why a user clicked the wrong icon. However, it does make the analysis and representation of the data more complex.

Although these are defined, in practice one does not usually start by thinking about the style and typically as you think about the problem and what primary data your research will collect to deal with it then it tends to define itself as predominantly quantitative or qualitative.

7.2 Research Approaches

There are two broad approaches to research, which is always essentially exploratory. In practice you do not decide the approach as such and it will effectively be decided for you when you formulate your research problem and construct your research design. However, we may loosely define:

Deductive – in the sense that we have a theory that we want to prove – in simple terms deduction amounts to a valid argument – that is if its premises are true then the conclusion automatically follows. Typically we form what is known as a null hypothesis. That is we set up our research question in the form that there is no effect of some parameter. For example, I might want to look at the significance of scripting languages on system development time. I could do this by setting up a null hypothesis that says 'I contend that the use of scripting languages have no effect on system development time'.

Inductive – in the sense that one hopes that the theory emerges from the data analysis as we go along. It follows that we don't have a hypothesis we just know that we want to explore a certain domain to see what emerges. For example, I might want to investigate the fact that students are not attending chat sessions but I have no idea why (I don't have a theory) so the whole point of doing the research is to explore the issue implied by the question and hope that something will emerge as I go along. So induction is a kind of grounded argument, the truth of whose individual premises would not *guarantee* the truth of its conclusion, yet one hopes that it would provide some evidence for it.

In short we might say that deduction is an outlook we take when we are sure that we know what the outcome is going to be but Induction is an outlook we take when we can only feel probable about a given outcome.

7.3 Research Outlook

Before we look at the various research methods it is useful just to records that there are two approaches that are available to a researchers.

Hypothesis Driven – this is the classical research paradigm where we have by some means devised a theory or speculation of some kind and the research is then directed at trying to show that the theory or speculation is valid. For example, we might theorise about who buys Gel Pens and then try to show that it is true, or more usefully try to explain in a report why it is true

Data Driven – it often happens that when we embark on research we don't have a hypothesis which we are setting out to test. This is very common today where corporations have vast databases and want to see if there is anything useful in there that might for example lead to competitive advantage. It follows, that in these cases we don't start with a hypothesis but we examine the data sets looking for patterns or outliers or indeed anything that might allows is to formulate a theory of some kind. For example, we might look through millions of sales transactions and then to hypothesise that people who buy Gel Pens all have beards and wear glasses. If this theory is true we can better target our Gel Pen products.

7.4 Which Method to Use?

There are many methods/models that we can use for setting up a research idea, the most common being: case studies, vignettes, action research, experiments, quasi-Experiments, surveys, biographies/histories, grounded theory, ethnography and requirements gathering. It is never easy to decide on a method or perhaps more than one method, but the following may help you to make up your mind. Start by asking what exactly are you trying to do or find out? This will help you decide whether you need a qualitative or quantitative approach. So here are something you might consider:

Choosing a method will depend on many factors such as: context, available literature base, basic research purpose, is the domain changing rapidly, time available, skill available, sampling and other practicalities, access, your personal stylistic inclinations, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on. Notice these factors are almost all about practical things - the whole point being that a design has to be carried out and that means it has to be practical.

7.5 Research Basic Purpose

In research, usually we try to do one or more of the following: understand something, explore something, describe something, explain something, illustrate something, improve something, build something or prove something. It is therefore very important when you are trying to decide on a method to keep this basic purpose uppermost in your mind.

7.6 Rationale: Case Studies

The case study method focuses on just one, two or twenty examples – such as your place of work, or one element of your organization or several aspects of a problem area. Typically:

1. Case studies are commonly used to **illustrate** or **understand** a problem or **indicate** good practice.
2. Case studies always have a context so make sure you are aware of it.
3. Case studies are usually qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain or describe some activity or phenomena.
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. There are broadly speaking two ways to begin case studies. This first is that you can set criteria and then go looking for relevant cases or secondly you can design and create the cases.
7. For most case studies there is usually be a longitudinal element - that is the cases will run over a fixed time period and you will periodically visit each case to collect the data.
8. There are several kinds of case possible:

Unique – implying that the setting and context are extremely rare and there may no be another chance to study this problem area again.

Critical – implies an important theory that you want to test and a particular case fits that profile.

Representative – implies that the case profile represents a typical or everyday situation.

Revelatory – implies that the case profile allows a researcher to study a situation never before looked at in detail and its context may be come common.

9. In practice you can use the following to organise your cases but remember once you have your case design you will need permission from whoever is necessary.

How many cases – be practical because there are time limits.

Case Criteria - add as many criteria as you think necessary to pin down the data location but don't have so many that you will never find a case that fits.

Sample criteria (collection protocol) – add as many criteria as you need to pin down a particular sample point where a unit of data can be obtained.

Visit Frequency - each case must be visited to get the data so work this out by looking at how much total time is available for the study.

Data collection Vehicle – by observation, interview, document analysis, etc. You will have to have a protocol to say when a valid sample arrives.

7.7 Rationale: Vignettes

These are perhaps best thought of as micro case studies or snapshots that illustrate just one idea and almost always are qualitative in their application. Typically:

1. Vignettes are commonly used in research contexts where actions, motives and judgements are to be explored, often in sensitive situations and you want to extract and **describe** examples or **illustrations** of significant elements in that problem domain
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain, test an idea or describe some activity or phenomena.
5. Typically you cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept. Therefore, this may also be useful when only a small sample is possible.

7.8 Rationale: Action Research

The main purpose of action research is to improve identified practice in some way. Typically:

1. Action research is commonly used to conduct research at the workplace with a strong desire to **improving** aspects of your own or colleagues' work so
2. In this kind of research you must be in control of events and they must be contemporary.
3. Typically indicated as useful when the research question starts with 'how' and there is a desire to explain something and use that explanation to improve practice.
4. Because of its setting, it is obvious that the research design is linked closely to its context.
5. The whole point of doing action research is the research leads to change in practice.
6. The working strategy is: plan something, do something, observe the something and reflect on what has happened as a result of your actions.

7.9 Rationale: Experiments

This form of research is used where there is a hypothesis and an associated variable that you can control (the independent variable) that will produce a change in some other variable (the dependent variable). That is the whole idea implies that you can intervene by altering or controlling the independent variable. Typically:

1. Experiments are commonly used when you want to **prove** or at least **indicate** that something is true. In practice proof is very difficult as it would imply that your findings are true for everyone, everywhere and for all time and so then tendency is to say indicate rather than prove in most cases.
2. In very simple terms one forms two groups: one which is exposed to the intervention and one which is not and then we observe if there is any difference because of the intervention.
3. Typically indicated when the research question starts with 'how' or 'why'.
4. The researchers must be in control of the events being looked at and they must be contemporary.
5. The biggest risk is that there may be other variables involved which we are not aware of.
6. It is difficult to be sure that our sample is representative.

7.10 Rationale: Quasi-Experiments

This form of research is used where there is a hypothesis and associated variables but you cannot control any of them. It would be nice to think we always had time and resources to run a carefully designed experiment but unfortunately this is often not the case. In an experimental design one chooses the samples involved randomly and thus one has control. However, it may be that data already exists and you can test your theory on that existing data or it may be that you simply cannot get control over all the variables that you want. So an experiment and a quasi-experiment are very similar it's just that the quasi-experiment does not quite have all the trappings that a full experiment has.

7.11 Rationale: Surveys

This form of research is used when we want to ask a group of people a question or questions. Typically:

1. Surveys are commonly used when one needs to get and express an overall **understanding** of the properties in a given domain.
2. One could of course also survey 'things' as well as people.
3. Surveys lend themselves to future replication.
4. Typically indicated when the research question starts with 'who', 'what', 'where', 'how' many' and 'how much'
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. Questions must be well-designed and unbiased and may be asked by interview or questionnaire.
7. Be careful to distinguish questions that are asking for facts and questions that are asking for opinion
8. The results will be very dependant on having a big enough and representative sample.
9. Be clear as to how the data will be collected – by observation, interview, questionnaire, etc. You will have to have a protocol to say when a valid sample arrives.

7.12 Rationale: Biographies/History

This form of research is used when we want to trace an historical event and analyses/evaluate its history as this may lead to insights or explain certain action so that lessons may be learned.

1. Biographies/History are commonly used to form a **description** and **explanation** of events.
2. One can use this to look at individuals or organisations or even technology.
3. Typically indicated when the research question starts with 'what'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. Be clear as to how the data will be collected – by documentary study and interviews are common.
7. Histories are naturally chronological and are characterised by epiphanies (pivotal events) and almost always exists in a context.

7.13 Rationale: Grounded Theory

Here the main idea is to use research to arrive at a theory based (grounded) on collected data. Grounded theory is quite difficult to understand and practice.

1. Grounded theory is used in situation where the theory is unclear or even unknown and so there is a need to **explore** seeking **description** and **explanations** in a domain.
2. One can use this to look at organisations or technology.
3. Typically indicated when the research question starts with 'why'.
4. You cannot control the events being looked at but the events need not be contemporary.
5. This is typically a qualitative study.
6. Be clear as to how the data will be collected – by documentary study, interviews, questionnaires etc.
7. Grounded theory is systematic in that the idea is to gradually move closer to a position where we can suggest a theory or proposition.
8. The basic unit of research is the category which is something that may represent a unit of information and might be almost anything.
9. The essence of grounded theory is in its data processing where various forms of coding are used to gradually unlock meaning in the data.

Open Coding – essentially the formation of the initial categories of information – it is characterised by looking for properties or asking when the something is a dimension of the research space.

Axial Coding – this is about trying to assemble that data after open coding. This can be done by using a diagram or some logic that connects things or looking for causes or looking for contexts and consequences.

Selective Coding – here the researchers invents a plausible storyline that integrates the categories in the axial coding model.

Matrix – a final step (though often omitted) is to produce a conditional matrix that is supposed to make clear the social, historical, technological or economic conditions that prevail in a situation.

Theory – one hopes that as a result of all this processing a theory will emerge which of course may go on to be tested by a formal experiment.

7.14 Rationale: Ethnography

This form of research is used when to immerse ourselves in the day to day life of an organisation or group. In this context ethnography is a description and interpretation of a cultural or social group.

1. Ethnography is commonly used when we want a reflective **description** expressed in an **interpretive** manner.
2. One can use this to look at individuals but more typically organisations.
3. Typically indicated when the research question starts with 'why'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. You may alter the events being looked at because you are normally a participant observer.
7. Be clear as to how the data will be collected – by participant observation.
8. Ethnography is about immersion in a culture: behaviours, language, structures and functions.
9. In such studies one often encounters gatekeepers, key informants and communication relies on a sense of reciprocity by investigator and his subjects.

7.15 Rationale: Requirements Gathering

Requirements are simply a statement of a systems service (what it must do) or constraints (what it does not necessarily do). In practice saying what a system must do is often extended to how it will do it. This method is a form of action research but it differs in that the only contact one has with the people involved is at the requirements stage and possibly at the implementation stage though this may vary depending on the systems life cycle employed. You should use this method when you are setting out to build an application of some kind such as a computer application. There are 4 stages of requirements.

Functional Requirements - These are requirements that say what a system does or is expected to do. Typically this would involve or include most of the following: process descriptions, details of all inputs/outputs and details of all the data that must be held in the system.

Performance Requirements - This is usually understood to mean requirements that describe aspects of the system that are concerned with how well it provides the main functional requirements. For example: performance criteria such as response times or how long it takes to print a report, data throughput and storage needs and security considerations.

Technical Requirements - This aspect of requirement looks at the tools and method used to build the system. For example, it may happen that you have to use a certain database package or for other reasons you need to select a particular scripting language and so on. More often than not this aspect amounts to looking at technical constraints that must be applied in building the system.

Usability Requirements - Requirements that ensure that there is a good match between the system and its users. In most cases usability is expressed in terms of measurable objectives.

7.15.1 The Requirements Document

The system and software requirements are usually documented in a formal manner so that ones understanding may be communicated to customers and system builders. The requirement document describes the following:

Services and Function – that the final system must deliver.

Operational Constraints - under which the system must operate.

Development Constraints - on the process used to develop the system.

Properties of the system - in the sense that it may have unplanned additional functionality.

Links - definition of other systems with which the system must integrate.

Domain - Information about the application - for example how to carry out certain tasks.

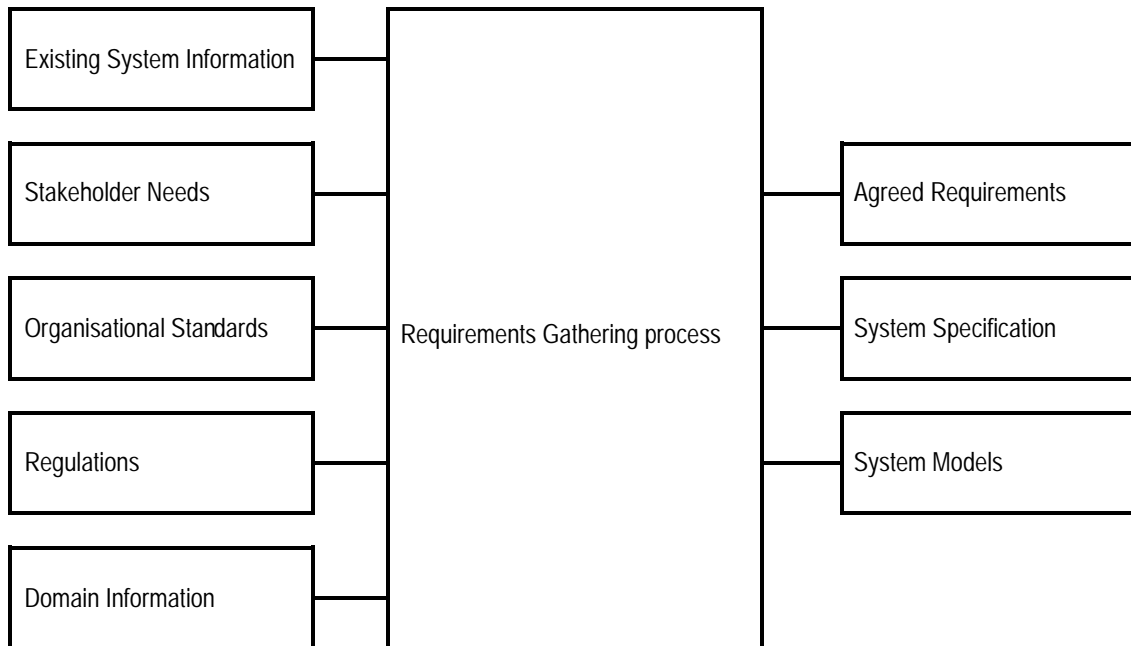
Definitions – acronyms, abbreviations etc.

7.15.2 Stakeholders

These are people who will be affected by the system and therefore should have a direct or indirect influence on the system requirements.

7.15.3 A Process Model

As a process model we might define the requirement process as follows.



7.15.4 Requirement General Questions

There are perhaps four general questions we might ask when attempting to gather requirements

Problem - What are the problems with the current processes?

Improvements - What are the improvement goals?

Reference. Kotonya, G. and Sommerville, I, (1997), Requirement Engineering, Wiley, ISBN 0-471-97208-8. This book is useful because it also contains excellent reading and reference lists.

7.16 Research Design

Finally, you must set out your research design. That is, explain how you will get your data – and this must be done in great detail. In summary, then, your research design is the blueprint of your research project which enables you to deal, systematically, with:

What questions to study?

What data is relevant?

What data to collect – you will need to work very hard here so that you can rely on your data.

Are there any practical limitations to what you can do

How to analyse the results – don't shirk this.

How to decide in which contexts your findings are applicable or can be exploited.

The main purpose of your research design is to help you avoid a situation in which the evidence you eventually collect does not address your initial question.

7.17 Research Process Development

It is quite common is many kinds of research but notably in Case Study and Action Research for the researcher's perceptions to change as data emerges. Often this will imply that the research design has to be changed or amended if it is to remain meaningful. These changes may be small such as a slight modification to the Research Question or aim but occasionally it may be necessary to make significant changes. For this reason researchers must always be careful in their design to allow a little flexibility if they can to accommodate possible unforeseen circumstances.

8. WORKBOOK 8 - BIBLIOGRAPHIC REFERENCING HARVARD APA

This workbook is a short summary of the APA style guidelines as contained in The Publication Manual of the American Psychological Association, 5e, 2001 (Subject Reference Collection: 808.02 AME).

The APA style is based on the Harvard referencing system whereby the date of publication follows the author name(s), and in-text references refer to items in the reference list using the author surname and date of publication, in brackets.

Referencing is important in all academic work as it indicates to the reader the sources of your quotations and borrowed ideas. Failure to indicate your sources is tantamount to plagiarism (literary theft). The purpose of the referencing system is to describe your sources in an accurate and consistent manner and to indicate within the text of your paper where particular sources were used.

Please note that there are two sections to this document:

How to **reference** correctly a source in the **bibliographic** section of your work

How to **cite** correctly a source in the **written** part of your work

Don't Get Caught Out! If you do not reference correctly you may lose marks or your work may be returned unmarked to you for correction. Therefore:

Keep a careful note of all sources used as you prepare your assignments.

Record all the details you need about a library book (including page numbers for any quotations) **before** you return it - someone else may have the book if you try to go back and check later.

Make sure you write down the source details you need on any photocopies or downloads you make.

Remember to print or save details of any website you want to refer to and record the date when you accessed the information.

8.1 Reference list (Bibliography) at end of Project/Dissertation

The reference list should be arranged alphabetically by author surname. The APA format requires book and journal titles etc. to be italicised, although we are not strict about that.

As a rule in projects and dissertations it is normal to produce two lists. The first is a reference list and that **MUST** only include sources you have cited. The second is a bibliographic list which includes all other sources you might have found but did not cite – this list is to allow the reader to explore the topic further if they wish.

8.2 Books

The details needed for a book can normally be found on the front and back of the title page. Make sure you locate the name of the publisher rather than the printer or typesetter. You need the name of the publisher in your reference list. Ignore any reprint dates; you need the date when the first, second, third edition etc. of the book was published according to which edition of the book you are using.

8.3 Journal articles

The details needed for a journal article can usually be found on the contents list, front cover or article itself.

8.4 Printed publications: Examples of References

The following are sample if how to correctly reference a source.

Book – pattern: Author, Initials. (year). Title of book. Place of publication: Publisher.

American Psychological Association. (1994). Publication manual of the American Psychological Association 4e. Washington, D.C.: Author.

Encyclopedia of psychology. (1976). London: Routledge.

Gardner, H. (1973). The arts and human development. New York: Wiley.

Moore, M. H., Estrich, S., McGillis, D., & Spelman, W. (1984). *Dangerous offenders: the elusive target of justice*. Cambridge: Harvard University Press.

Strunk, W., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

Note: Only list up to 6 authors. The 7th and subsequent authors are abbreviated to et al.

Edited book

Maher, B. A. (Ed.). (1964-1972). *Progress in experimental personality research* (6 vols.). New York: Academic Press

Article in edited book (Chapter) - The basic pattern for a reference to a chapter in an edited book (where the chapters have been written by several different people) is:

Author of chapter, Initials. (year). Title of chapter. In Initials. Name of Editor/s (Ed.) *Title of book* (pp.start and end page numbers of chapter). Place of publication: Publisher.

Vygotsky, L. S. (1991). Genesis of the higher mental functions. In P. Light, S. Sheldon, & M. Woodhead (Eds.), *Learning to think* (pp. 32-41). London: Routledge.

Encyclopedia entry - If the entry has no author, begin the reference with the entry title followed by the date of publication.

Lijphart, A. (1995). Electoral systems. In *The encyclopaedia of democracy* (Vol. 2, pp. 412-422). London: Routledge.

Government publication

Great Britain. Command Papers. (1991). *Health of the nation* (Cm 1523). London: HMSO.
Great Britain. Home Office. (1994). *Prisons policy for England and Wales*. London: HMSO.

Report

Birney, A. J., & Hall, M. M. (1981). *Early identification of children with written language difficulties* (Report No. 81-502). Washington DC: National Educational Association.

Conference paper in published proceedings

Borgman, C. L., Bower, J., & Krieger, D. (1989). From hands-on science to hands-on information retrieval. In J. Katzer, & G. B. Newby (Eds.), *Proceedings of the 52nd ASIS annual meeting: Vol. 26. Managing information and technology* (pp. 96-100). Medford, NJ: Learned Information.

Journal article - The basic pattern for a reference to a journal article is:

Author, Initials. (year) Title of article. *Title of journal*, Volume number - if there is one (Issue number), start and end page numbers of article.

Noguchi, T., Kitawaki, J., Tamura, T., Kim, T., Kanno, H., Yamamoto, T., et al. H. (1993). Relationship between aromatase activity and steroid receptor levels in ovarian tumors from postmenopausal women. *Journal of Steroid Biochemistry and Molecular Biology*, 44(4-6), 657-660.

Popper, S. E., & McCloskey, K. (1993). Individual differences and subgroups within populations: the shopping bag approach. *Aviation Space and Environmental Medicine*, 64(1), 74-77.

Weekly magazine article

Barrett, L. (2001, August 23). Daewoo's drive to survive in the UK. *Marketing Week*, 22-23.

Newspaper article

Caffeine linked to mental illness. (1991, July 13). *New York Times*, pp. B13, B15.
Young, H. (1996, July 25). Battle of snakes and ladders. *The Guardian*, p. 15.

Two or more works by the same author(s) with the same publication date - Where an author (or particular group of authors) has more than one work in a particular year, list them in title order and follow the date with a lower case letter a, b, c, ... For example:

Harding, S. (1986a). The instability of the analytical categories of feminist theory. *Signs*, 11(4), 645-64.
Harding, S. (1986b). *The science question in feminism*. Ithaca: Cornell University Press.

Anonymous works - If a work is signed "Anonymous", your reference must begin with the word Anonymous, followed by date etc. as normal. If no author is shown, put the title in the normal author position.

Note on source page numbers - Use pp. for page range only for encyclopedia entries, multi-page newspaper articles and chapters or articles in edited books. For articles in journals or magazines use the numbers alone.

Interviews and email messages - Because interviews and email messages are not considered recoverable data, you do not give details in your reference list. You should, however, cite an interview or email message within the body of your text as a personal communication: ...and this point was conceded (J. Bloggs, personal communication, August 22, 2001)

Legal References - Because the situation regarding legal references is complex and only US law is covered in the APA Manual, legal references will be covered in a separate guide.

Audiovisual sources: examples of references - Such sources are often complex but please note.

Films - The basic pattern for a reference to a film is:

Name of primary contributor - the director or producer, or both, Initials. (Role of primary contributor). (year). *Title of film* [Motion picture]. Country of origin - where the film was primarily made and released: Name of studio.

Reed, C. (Director). (1949). *The Third Man* [Motion picture]. United Kingdom: British Lion/London Films.

Spielberg, S. (Director). (1993). *Jurassic Park* [Motion picture]. United States: Universal Pictures/Amblin Entertainment.

If the film doesn't appear on the Library Catalogue, the Internet Movie Database <http://uk.imdb.com/> is a good place to check all the details needed for a film reference (follow the Company credits link to find details about the film studio/s involved). Alternatively, check Halliwell's Film and Video Guide.

Review of a film - If the review is untitled, put everything in square brackets in the normal title position and keep the square brackets.

Kinder, M. (2002). Moulin Rouge [Review of the motion picture *Moulin Rouge*]. *Film Quarterly*, 55(3), 52-59.

Malausa, V. (2001). Beauté du mensonge [Review of the motion picture *The Tailor of Panama*]. *Cahiers du Cinéma*, 558, 82-83.

Television programmes

Collinson-Jones, C. (Producer), & Dobson, E. (Director). (2003, July 14). Casualties of peace [Television broadcast]. London: Channel 4.

Single episode from a television series

This example shows the most complete information possible for a television episode. If details of the writer are unavailable, begin your reference with the name of the director.

Fraser, R. (Writer), & Geoghegan, S. (Director). (2003). Eyes wide open [Television series episode]. In P. Goodman (Producer), *Holby City*. London: BBC1.

Radio programmes

Portenier, G. (Producer). (2003, July 17). *Crossing continents*. London: BBC Radio 4.

Electronic sources: examples of references - The details shown below have been compiled according to the guidelines available on the APA Website (<http://www.apastyle.org>) in August/September 2001 (re-checked July 2003). Check this Website and the 5th edition of ***The Publication Manual of the American Psychological Association*** which is available in the Frewen Library for further guidance.

The basic pattern for a reference to an electronic source is:

Author, Initials. (year). *Title*. Retrieved month, day, year, from Internet address.
Banks, I. (n.d.). *The NHS Direct healthcare guide*. Retrieved August 29, 2001, from <http://www.healthcareguide.nhsdirect.nhs.uk/>

If no date is shown on the document, use n.d.

If the author is not given, begin your reference with the title of the document.

If a document is part of a large site such as that for a university or government department, give the name of the parent organisation and the relevant department before the Web address:

Alexander, J., & Tate, M. A. (2001). *Evaluating web resources*. Retrieved August 21, 2001, from Widener University, Wolfgram Memorial Library Web site: <http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm>

Deciding your future. (2000). Retrieved September 5, 2001, from University of Portsmouth, Careers Service Web site: <http://www.port.ac.uk/departments/careers/plancareer/deciding-your-future.htm>

Electronic journal articles which are duplicates of the printed version - Use the same reference format as for a printed journal article but add "Electronic version" in square brackets after the article title:

Lussier, R. N., & Pfeifer, S. (2001). A crossnational prediction model for business success [Electronic version]. *Journal of Common Market Studies*, 39(3), 228-239.

If you are referencing an online article where the format differs from the printed version or which includes additional data or commentaries, you should add the date you retrieved the document and the Web address (URL).

Articles in Internet-only journals

Korda, L. (2001, July). The making of a translator. *Translation Journal*, 5(3). Retrieved August 21, 2001 from <http://accurapid.com/journal/17prof.htm>

Use the complete publication date shown on the article.

Note that page numbers are not given.

Whenever possible, the URL you give should link directly to the article itself.

Break a URL that goes onto another line after a slash or before a full-stop. Do not insert a hyphen at the break.

Articles retrieved from a database - Use the format appropriate to the type of work retrieved and add a retrieval date, plus the name of the database:

McVeigh, T. (2000, July 9). How your gestures can do the talking. *The Observer*, p.7. Retrieved September 10, 2001, from The Guardian and The Observer on CD-ROM database.

8.5 Citing references in the text

There are basically two forms. The first is when the author's name is naturally part of the sentence and the second when it is just a reference. References are made from the text of the paper to the full details of the work in the reference list in the following manner:

It is a contention of the paper, and this contention is supported by Williams (1995, p.45) who compared personality disorders ...

When an author, or group of authors, has more than one publication in the same year a lower case letter is added to the date. For example:

In two recent works Harding (1986a, p.80; 1986b, p.138) has suggested that ...

With two authors both names should be listed in each citation e.g. Duncan & Goddard, (2003, p.99)

With three to five authors name all authors the first time, then use et al. (and others). For example: the first time it would be Moore, Estrich, McGillis & Spelman (1984, p.33) and subsequent references to the same publication would use Moore et al.

For six or more authors, use et al. after the first author in all occurrences.

Note that when the in-text reference occurs naturally within the sentence "and" should be used before the final author.

When a source has no author, cite the first two or three words of the title followed by the year. For example:

... in the recent book (*Encyclopaedia of psychology*, 1991, p.62) ...

... in this article ("Individual differences," 1993, p.12) ...

Web pages where no author is given

However, if the author is designated as "Anonymous", cite the word Anonymous in your text e.g. (Anonymous, 1993, p.116).

When using quotations in your text

Try to observe the following methods.

Gardner (1973, p41) stated that, "The relative importance of the systems may nevertheless remain in approximately the same proportion"

Smith (1991, p84) found that "...there is no evidence that chimpanzees can produce a drawing and discern the object represented in it..."

Occasionally, very occasionally you may need to cite a work that you discovered in another work because you cannot find the source then observe the following examples:

Smith (1970, p.27) cites Brown (1967) as finding ...

Brown (1967), cited by Smith (1970, p.27), found ...

It was found (Brown, 1967, cited by Smith, 1970, p.27) that ...

If you need to use this form your tutors must approve it and you must show that you have made every effort to track down the primary source.

9. WORKBOOK 9 – WRITING UP A RESEARCH PROJECT

This document is in several sections covering everything from project supervision to grading.

9.1 Your and Your Supervisor

The student supervisor relationship is very important if a high quality project is to be the outcome. As a rule the supervisor will be interested in the topic area and will want to be active in its development although you as a student must do the work. However, your supervisor will not be expert in everything but will usually have some knowledge of simple statistics and the four main research methods: experiments, action research, surveys, case studies and application development.

9.1.1 Student Expectations

The normal expectation is that students have of their supervisor are as follows:

- Only be available for consultation for a limited time.
- Only supervise what the student does and not do the work for them.
- Advise on research design, scheduling and literature surveys.
- Advise on theoretical, conceptual and methodological issues.
- Advise on development of research skills.
- Advise on data collection, processing and analysis.
- Advise on ethical issues if they are relevant.
- Read, evaluate and be constructively critical of student work if given sufficient time.
- Have a good knowledge of the general area you are working in.
- Be in contact with the student regularly.
- Arrange if necessary supervision chat sessions.

For project students on distance learning programmes it will be possible to have meetings in the WebCT chat room, using IM or Skype where a full and detailed interaction can take place. These must be agreed with your supervisor and must be planned not to clash with other classes. However, some tutor may allow student to contact them any time they are seen to be online.

9.1.2 Departmental Expectations

Supervisors take a formal role and certain attitudes and actions are expected. In general they will:

- Visit the discussion board and email regularly within WebCT (at least 3 times per week).
- Set a mail forwarding address to their personal accounts in WebCT email settings.
- Devote at least 6 hours to the supervision process spread over the project duration.
- Conduct one-to-one chats as required with project students.
- Conduct student/supervisor communication within WebCT or their personal email account.
- Respond to a student query within a certain time frame (normally no longer than 3 days).
- Be familiar with all the project guidance notes and workbooks.
- Be familiar with the project chapter profiles.
- Make sure students know if they are to be away for an extended period.
- Be aware that students may make contact though any one of their three WebCT accounts.

The essence of online supervision adequacy is based on the quality of communication between supervisor and student with the intent that we want the learning experiences to be exiting, stimulating and self-rewarding. In practice this means that communication must be frequent, lucid, critical and yet encouraging.

Supervisors should be aware that if they set email forwarding in WebCT they will effectively get an automatic alert when there is mail for them. If the student has also set mail forwarding then supervisors will be able to reply immediately otherwise they will have to go into WebCT. However, there is no alerting mechanism if a student posts a question into discussion so supervisors must visit the site from time to time so as not to miss any messages.

9.1.3 Supervisor Work Reviews

Supervisors will read your written work. However, when they do this certain rules apply:

Finished work – you should supply your supervisor with written work as it is produced chapter by chapter but it must be finished work. In this context finished work means that the format and content are the very best you can produce and in accordance to the guidelines found in this workbook. The tutor's role is not to act as some kind of filter for rough work or polishing multiple drafts which you want to improve in effect making them do the work for you. If a tutor suspects that the section you have sent in is not in its final form they will return it to you without comment.

Action on Feedback – if you are given feedback on any part of your work then you are expected to study it with care and commitment. However, it is up to you how to respond or even ignore what you are told but in all cases the consequences that follow are entirely your own responsibility.

Responding to Feedback – in all cases you are expected to respond to feedback. This may take several forms: writing to your supervisor saying that you don't agree with him or perhaps offering further explanation or as in most cases making changes to the content or structure of your project document. When you make document changes in response to feedback they are to be shown **shaded** so your supervisor can easily see exactly what you have added or amended.

Questions to Tutor - your tutor will not answer any questions regarding whether your work is right, wrong, is it a pass, what mark will I get or is it good enough. The only thing you can expect in this area is that you tutor may advise you that the work is not ready for submission to the university. If this happens it will be entirely your own decision whether to submit or not.

Response from Tutor - in most cases you supervisor will only suggest that you do something or ask a question designed to point you in a new direction. Normally, the tutor will not supply you with any project content since that must be provided entirely by you. The reason is that the work is yours not the supervisors.

Preparation - Your supervisor will expect you to be familiar with all the notes and workbooks contents. You should therefore be careful that you don't waste supervision time asking questions to which you already have the answers.

9.1.4 Chat Session

Chat sessions for project students will usually be one-to-one and are typically used when there are particularly awkward difficulties – chat will NOT be the norm during projects and your tutor will have no expectation that chat will be used.

9.2 Overview of Project Structure

Here are some general guidance notes – they are NOT suggested chapters but general content guidance on the project as a whole and have a sharp process focus.

9.2.1 Introduction summary

This is about the problem theme and its setting, client context, topic area, personal theory, Research Question or application functional description and intended project outcome, general research orientation followed by a well-define aim and sound set of objectives. The introduction is to be precise, concise taking a discussion form that is explanatory and focused on giving readers a clear, coherent and comprehensive view of what the project is about.

9.2.2 Preparation for Research

This is your study of the topic area and research methods that you will need to know about. You will have to justify and explain the methods you intend to use; it is also your study of other people's work in the area that you wish to investigate - and a description of how you learned from their research.

Literature Review - What has been done before in this area - related to a particular problem theme and Research Question. This is all about preparing ones mind with all the topic area and research knowledge you will need.

Research Review - research into how the project investigation could be done and supported. At this stage student will already have an outline plan based on their approve specification but now the whole design must be thoroughly reviewed before actual work begins.

Knowledge of Alternatives – build a simple decision base which allows one to consider which methods could be used and how could they be used for this project.

Choices Made - which methods are to be used and rationally consider why they are good enough for the purpose.

9.2.3 Core Research

Here you execute the refined research design translated into a practical plan to obtain the collection of primary data and process it using acceptable methods into the intended project outcome.

9.2.4 Evaluation and Conclusions

This is the stage that looks at how one finishes off a project by a process of evaluation and the drawing of conclusions. In particular, it is needful to look at how one evaluates what was done and how it was done – that one needs to consider the project product (or outcome) and the project practice. For our purposes evaluating will be taken to mean reflecting on product and practice.

Many students confuse evaluation and conclusions but for a full consideration of the research work one must look at all project specific results and outcomes as well as practices and evaluate them and then perform the more difficult step of drawing generalised conclusion about both product and practice.

Evaluation of Project Product – the project outcome or product is normally evaluated against objectives, other existing products, using defined criteria or some form of expert evaluation. Additionally, one needs to be aware of any constraints that might have an impact on the applicability of the outcome

Evaluation of Project Practice - evaluation of project practice is more difficult than evaluation of project product and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way'. Additionally, one needs to be aware of any constraints involved, including time management that might have impacted on the use of best possible practices.

Conclusions - need to be considered thoughtfully as this is the point where one looks for implications and meaning that arise out of an attempt to generalise the findings.

9.3 Writing up your Project

The following sections describe elements that occur in almost all projects and which are generally important in constructing scholarly work. Do not be tempted to ignore these instructions – anyone who departs from the spirit of them may have their work returned for correction prior to formal marking.

9.3.1 Main Project Body Page Layout

The following example shows how each page of a project report should look, note that each chapter should start on a new page and that it is NOT necessary to actually say Chapter 1, Chapter 2 and so on as it is the heading that is important. Do not use numbering to greater than to three levels but you may use indented (but not bulleted ones) entries within a section at any level.

1. QUALITY CONTROL IN PROGRAM DEVELOPMENT

In this chapter the nature of quality will be discussed and its relation to physical measurable properties that might characterise quality.

1.1 INTRODUCTION

This project discusses a possible strategy for devising a program development methodology that goes some way to guaranteeing the qualities of the delivered system. In particular it will concentrate on just two aspects - that of developing generic designs and code and how such designs could be assessed for quality and function. The strategy is based on the simple premise as endorsed by leading authors in the field such as Blenkinsop, Wilson and Bowers that categories of problem can be identified and formalised. It is the contention of this report that such a process would more or less automatically:

Reduce - the complexity of the design process itself.

Ensure - the quality of the final product by:

Giving managers more control over the product development cycle.

Giving users more idea of the kind of system they are likely to get and much more say in what the shape of the product will finally be.

Releasing programmers from the drudgery of having to design the same piece of code over and over again, thus enabling them to concentrate their efforts on new

Formatting Note – you are encouraged to use these two forms of indenting: one with a heading in bold and one without as a means of structuring and indented section. The use of bulleted indents is not recommended anywhere in a project document.

1.2. Multiplicity of Design Factors

Every programmer has had the difficult experience of having to read and understand programs written by someone other than himself or herself. The sort of problem encountered may be aptly expressed in the following lines.

Everything has been thought of before, but the problem is to think of it again. (Goethe)

Many other authors, notably Frewin (1989) have discussed the notion of 'quality model ratios' and in essence this idea means that software systems have an implied model which can be accessed for

1.2.1 Multi-Tier Systems

In modern client sever systems

1.2.2 Interface Facades

In this case we look closely at the Internetetc

9.3.2 Plagiarism Checking

A software tool will check all your sources automatically and if plagiarism is suggested it will be dealt with very seriously since the reputation of the whole course and of the University is at stake. You must remember, that copying, paraphrasing, summarising and similar techniques where the material is extracted from a source must be properly acknowledged.

A simple rule is that if you use more than 6 consecutive words from a source it must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

9.3.3 Writing Abstracts and Identifying Keywords

The function of an abstract is to summarise your project, its context and its conclusions in order to give the reader an overview of the main project theme so that they can make an informed decision on whether they want to read the entire report. A good basic structure might be defined as follows but it will usually be limited to around 300 words.

What was the project about?

What did you actually do?

What were the conclusions?

It is normal to add keywords or phrases after the abstract to act as specific pointers to content. There are no particular rules about how to construct these words or indeed how many there should be but typically there are 5 or 6 and to be useful they must be chosen with care in the sense that they might in themselves be regarded as a sort of abstract of ones work.

9.3.4 Standard Appendices

Project reports MUST include the following appendices:

Your Project specification – it may be brought up to date from that submitted at the start

Your project plan expressed in an appropriate format

A glossary if this is appropriate

A full reference list of work that you cited

A bibliography (may be combined with your citation list)

Each Appendix should be introduced by a title where the number (12 in this case) should follow on from the numbering within the body of the report: **12. Appendix A – Project Specification.**

9.3.5 Typical Project Organisation

Below is a suggested organisation for your complete project.

Briefing Pages

Heading pages (examples follow later in the section)

Plagiarism declaration

Abstract for Report including keywords

Acknowledgements

Dedications

Content list (automatically generated) for all headings, tables and figures/graphs etc

Introduction:

Brief topic area outline and background to problem
Presenting Problem definition
Real World Target relevant to the problem
Speculation of problem causes and possible solution routes
Personal Theory on the best solution route
Research Question/Application Description
Discussion of expected project outcome
Scope of work
Aim & Objectives

Literature Research (see Workbook 5 for recommendation for various project styles)
Detailed consideration of elements that help you focus on your topic area

Research Design

Research Method and its rationale in dealing with the research question/application
Process to collect Primary Data
Processing of the Primary Data to get an outcome

Application Testing (Engineering project only)

Design of Tests
Test Results and conclusions to be drawn from testing.
Implementation plans

Results Discussion and Presentation (study projects only)

Discussion and presentation of results
Generation of intended project outcome

Evaluation (these are specific to what you did)

Detailed evaluation of what was actually done – your practice
Detailed evaluation of your project product/outcome including objectives not met
Met/Not met objectives

Conclusions (here one tries to generalise what was done)

Generalisations based on a consideration of both product and practice
It is also possible to examine the following minor conclusion elements

- Usefulness of literature sources
- Future work/development
- Relevant aspect of the course used during the project period
- Changes one would make if project were repeated
- What you have learned
- Value-added features

References and bibliography (see workbook 5)**Content of Appendices**

The following items must be in a set of Appendices. These may be bound separately if the composite document becomes too large (more than 100 pages).

- Code listings
- Project Specification and project schedule
- Inclusions (copies of relevant documents such as policies, invoice layouts, diagrams etc)
- Questionnaires.
- Summary interview transcripts
- Details test plans
- Requirement catalogues
- Glossary
- Other

9.3.6 Project Types Sample Outline Contents

Broadly speaking there are two kinds of project: engineering where you build an application of some kind and study based where one would investigate in depth some idea. Here are some sample contents lists that show chapter or section headings for the different project styles. However, if it is obvious that these samples have just been copied into your project with minor changes then your work will be rejected. See Workbook 9 section 9.3.5 for further general details.

Sample Study Style Report Contents	Sample Engineering Report Contents
Title: Internet Marketing – A Users View	Title: BrokerBase – Insurance Sellers Information System
Chapter 1. Introduction to Internet Marketing	Chapter 1. Introduction to System
Introduction and contextualisation IT marketing problem theme Problem Theme and target Speculation and Personal Theory Discussion and Exploration of Research Question Project aim and objectives	Introduction and Situation Overview Situation based Presenting Problem Application background and context Application overview Project aim and objectives
Chapter 2. Literature Review	Chapter 2. Literature Review and Application Scenario
Introduction to Internet Marketing Marketing Planning eCommerce Technologies and Tools Costs and Benefit Estimation Consumer Orientation and Market led operations IT supported Marketing and selling techniques Product, Price, Place, Promotion and Customer expectation IT supported Experiential marketing Security protocols and languages Auditing and secure payment systems	Outline of Insurance Brokerage practice Background Review of the Application Scenario Outline of Application Build Process and Tools
Chapter 3. Research Design	Chapter 3. Requirements Specification
Research Method Selection and Rationale Primary data collection process Data specification Data locations and expectations Collection Protocol Processing of Primary Data Collection Outline Results Project Outcome	Outline of the requirements (requirement catalogue into appendix) Research Plan for requirement gathering: functional, performance, technical and usability Outline Requirements catalogue Analysis and Evaluation of requirements
Chapter 4. Evaluation (Project Specific)	Chapter 4. System or Application Design
Evaluation of Project Outcome Evaluation of Research Methods and Protocols used	Principles used for this design Overall system design Build Process Overview Database design Component design Interface design including website
Chapter 5. Conclusions (Project Generalisations)	Chapter 5. System Implementation and Testing
Generalisations on the research Outcome Reflections on what was learned etc	Testing strategy Testing plans (detailed plan placed in appendices) Test results (detailed report placed in appendices) Application Implementation plans
	Chapter 6. Evaluation
	Evaluation of the application Evaluation of practice (methods and tools used)
	Chapter 7. Conclusions
	Generalisations based on the Application Reflections on what was learned Future work Etc
Notes	
1. Whatever the project styles the appendix must include: the project specification, glossaries, references lists, bibliographies. The appendices may be attached to the main report or they may be placed in a separate document.	
2. Remember these are just samples and you may well have different numbers of chapters and different heading and sub-headings	
Table 6. Sample Project Content Outlines	

9.4 Report Writing

In your research you will often have to write reports and of course you will have your final report to write. Reports are a special form of writing and therefore you need to note that reports are:

- Written for defined purpose.
- Written and targeted at specific audience.
- Written systematically to present your findings.
- Focused on what you have done.
- Information structured and formatted to lead reader quickly to main themes and findings

9.4.1 Structural Elements

The following tables are intended to give you some guidance on how to construct report in a scholarly fashion and in a way that leads to clear and concise presentation. It is important to structure all your work in a way that enhances its usefulness and utility. The following is a list of all the major structural elements, though there is no need to use all of them in every document you produce. The best advice is to choose a structure and then those elements that best suit the work in hand.

Structure	Description	Location
Title	A focused and short description of the document that summarises the deliverable element	Front page and above the contents list
Contents List	A short index based on the major chapters and/or sections	Before the main document begins but after the title page
Glossary	Used to list and describe special terms or abbreviations	Towards the end of the main document
Index	A detailed listing of all important words or phrases specifying location in main text	After the glossary if it exists otherwise after the main document
Appendix	For inclusion of explanatory notes, special documents or copies of originals	After the glossary but before the index
Footnotes	Notes at the bottom of pages and linked to pieces of text.	Immediately before the page footers
Headers	Standard text	Every page
Footers	Standard text	Every page
Keywords	Words or phrases used to form a simple classification of your work	Near front of report
References	List of all reference material in an approved manner	Toward end of document

Table 7. Main Document Physical Structural Entities

Organisation	Description
Chapters	Major elements in the development of the subject matter of the document
Sections	Minor elements in development of each chapter
Headings	Major Information Content indicators
Indents	Used to emphasise small but important points in the text
Bullets	Used to further emphasise an indented text
Tables	Used to represent important information concisely
Paragraph numbers	Used when it is necessary to reference all parts of a text
Page numbers	Used for indexing purposes
Diagrams	Used to show idea or data pictorially
Captions/Legends	Added to diagrams where necessary
Columns	Use when the subject material lends itself to such a view

Table 8. Main Document Structural Devices

Presentation	Description	Examples
Font	Letter style and size	May be proportional or fixed point
Renditions	Printed form of font	Bold, underline, italic, reversed
Orientation	Page format	Portrait or landscape
Form	Delivery form	Paper, electronic
Table 9. Main Document Structural Properties		

9.4.2 Report Writing Stages

There are a number of stages to writing a report and they require you to be focused on what you are trying to show as the core of your report.

What are your trying to show – this really goes along with the underlying purpose of your research question – typically this will be about wanting: to inform, to explain, to evaluate, to prove, to advise, to recommend, to predict or to bring about changes.

Collect and sift material – it is important to jot down ideas relevant to your purpose. These jottings will help you form an action plan for gathering information from other documents, visits, interviews, observation, surveys etc.

Note - information sources as you find them

Organise and structure the material - group your work into chapters, sections and sub sections. Make sure the order is logical.

Draft and edit/redraft – to get a good report you may well have to re-write it several times and this may include complete re-ordering. It is important that you need to be concise and use a formal language but it must be clear and concise. Use simple, straightforward words and sentence construction and make sure your spelling and grammar are faultless. Use clear headings and sub headings with bulleted indentations.

Thematic – make sure your work has clear themes that are easy to follow.

Plain English - do not try to be over-clever or fall into jargon.

Read Saunders chapter 13 pages 414 to 443. Don't skimp on this or I might skimp when I mark inferior work!

9.5 Summary and Advice

Your final project must have a strategic dimension. This does not mean you can't build some software but if you do it will be in support of a strategic objective. So whatever you decide to do consider:

Why it is being done but note it will not be sufficient to just say why, you will have to show evidence for your conclusion.

Cost/benefit is a useful idea but in most cases it is very hard to show benefits. In any case you need to look at other possible ways of showing that something is worth doing.

Don't forget life cycle logistics - that is what are the costs per hour (for example) of running a system for say a 10-year life.

Also look for impact for what you do. For example something might be cost effective but may have a negative affect on some business element.

Think through your ideas; don't be narrow - question everything.

Traditionally strategies are developed around two themes: needs - what are the business needs (at a high level) and what are the business values (what does it regard as important)

9.6 Project Submission Regulations

Successful project reports may be lodged in the University library, it is therefore important that reports follow a standard binding format as described below. Project reports that deviate from these regulations may be penalised and returned to you for correction and in extreme cases, failed.

Submission - two full bound A4 portrait orientation copies of your report must be submitted by the defined dates. The report may NOT be submitted electronically – the copies must be sent by courier to reach us by the defined dates. However, you must also submit soft copies on either floppy disc or CD/DVD.

Presentation and Submission Checklist – your project report submitted using the correct form shown in Workbook 10. The form must be bound into your project.

Report Length - the maximum permitted report length is 15,000 words, which usually translates into around 50 to 100 pages (excluding appendices). If your report is likely to be significantly longer than this, consult your supervisor as to what to include and what to exclude. You are warned that should you exceed the permitted maximum length the University may return your work unmarked.

Binding - the project and any separate appendices should be securely bound using tape or book binding - if that is not available then plastic ring binding may be used. No other form of binding is permitted. Binding covers should be a card of weight of 140 gsm and the normal colour is to be RED but any other colour may be used in case of sourcing difficulties

Front Covers Format - the front cover appropriately spaced vertically should conform to the pattern shown below using 24-point Arial Narrow with centred text and bold as shown. Do not include the square brackets when you complete these formats as they are just placeholders

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [Name of supervisor]

Project unit Code [Project unit code]
[Month and Year, e.g. September 2004]

Title Page - the first project contents page, appropriately space vertically must contain the following information in the order shown below using 12 point Arial Narrow/Time Roman type throughout. Do not include the square brackets when you complete these formats as they are just placeholders.

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [*Name of supervisor*]

Project unit: [*Project unit code*]

[Month and Year, e.g. September 2001]

Abstract - [The abstract of the project should be between 150 and 300 words in length and constructed to say what the project was about, what you did and what were the conclusions]

Keyword List - [List of appropriate key words]

Acknowledgements Page - it is common practice to add a page listing those you wish to thank for their help and assistance. As a rule acknowledgements should **only** be given to people who helped you directly with your work but were not involved in it. For example, if a colleague supplied you with a statistical analysis they should be acknowledged. However, it is not usual, necessary or desirable to acknowledge your parents, your friends or your supervisor.

Submission Form and Plagiarism Declaration

You must add the following two pages which require a signature. In practice one adds the signature to the final bound copies.

Declaration of presentation Standards

Include at this point a completed copy of the project submission page shown in workbook 10. Be warned, that if you tick this page and the relevant element is not found to be present, the work will be returned to you unmarked for correction.

Plagiarism Declaration

I confirm that the enclosed written work (including application code) is entirely my own except where explicitly stated otherwise. I declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

Signed _____ Date _____

Contents list, Table List and Diagram List

Include as appropriate

9.7 General Grade Criteria

Workbook 14 gives general guidance as to how projects will be assessed. Workbook 14 also contains a table of the criteria used, although the emphasis given to various aspects may vary depending upon the nature of the work and should be explained to students in assessment specific criteria.

9.8 Project Examination Board Reflections

This is a discussion based on observations made on the marking forms and in the Examination Board regarding the quality of the submitted document as final Master's projects/dissertations. Most of these faults are due to shallow and sometimes very shallow thinking on the part of the project student and that is unacceptable at Master's level. The following points are to help both supervisors and students avoid known pitfalls and so produce a project document to a high standard.

9.8.1 Project Introduction – Study Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem definition – common deficiencies were no discussion or poor discussion of what problem was being addressed by the project. Without such a discussion it is almost impossible for a reader to get any grasp of what the project is about. In projects we want to see just ONE major problem theme not several so it often requires clear thinking to set it at the right level. (See workbook 6 section 6.2 and 6.5)

Target and Outcome – there is often considerable confusion over these two ideas. The target is about what might happen in the real world based on the project outcome but often students cannot distinguish what the project will generate and what might be done with that project outcome. As a simple example, students might say that the project outcome is "improved accuracy in data entry" when what they mean one supposes is that in their project they will design (say) a new training programme that will be used to get the real work target of improved accuracy.

Speculation and Personal Theory – students are encouraged to speculate about problem causes and solution routes to arrive at a personal theory about the problem theme and how it might best be resolved leading to a suggestion of an expected form project outcome. A reader expects to see some indication as to what form the project outcome will take and in addition some discussion of the form to at least show that it is likely to go some way to resolving the stated problem theme. Unfortunately, the form was often missing and even when the Research Design was consulted a typical reader could still not see what the project outcome was supposed to be. Here we want to see ONE major form outcome for each project. (See workbook 6 section 6.5).

Research Question - either missing, badly worded or multiple questions offered (sometimes all in one sentence). One common mistake was to ask a question in the form (or some equivalent) of "is it possible...." - the point is that in such questions the answer is almost always that it is possible so the research effort becomes pointless. (See workbook 6 section 6.7 and 6.9)

Process for Generating Primary Data - this is a key element in any project as it is essentially the main activity used to unlock the primary data. It is useful to discuss this process briefly in the introduction since that allows readers to link the problem theme and therefore see what data you are likely to be looking for.

9.8.2 Project Introduction – Engineering Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem Theme - there was either no discussion or poor discussion of what problem theme the application being built was supposed to resolve. When this happens it is almost impossible for a reader to get any grasp of what the project is really about. (See workbook 6 section 6.2 and 6.5)

Functional Description - many students could not provide a short functional description of the application they were going to build. The most common thing for students to do instead was to provide an overview of the application architecture. This is hopeless as architecturally almost all Engineering projects are the same in that they typically have a database and a webpage for example. This implies that students cannot or do not want to make a distinction between how an application is built and what its purpose is.

9.8.3 Aim and Objectives

In many cases these elements were missing altogether. In other cases one could barely link the aim to the Research Question or application description. However, of most concern was an apparent inability in many students to write a coherent and reasonable set of objectives. Not to be able to write an aim and more particularly objective is representative of a gross error and it should never occur in Master's level work.

Aim - usually composed in a reasonable way but there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just one clear outcome for the aim. (See workbook 6 section 6.11, 6.11.1)

Number of Objectives - often there were far too many to be in any way practical for one student in the time available and often this was because they were all expressed at different levels of project resolution.

No Visible Outcome - there were many, many cases where the objectives had no visible outcome. Far too often we got phrases such as: "To understand...." or "To analyse...." without any object to the sentence so there was no outcome that was visible. Without a named outcome there is no way that the objectives can be seen to have been completed. (See workbook 6 section 6.11)

Not Project Bounded - there were many students who cited operational objectives as outcomes. For example it was common to see lines such as such things as "To improve the workflow in the invoicing section". Here is a case where such an outcome cannot be written into a document or be in practical terms viewed and so cannot be used in a project. Typically, unbounded objectives refer to something that might happen based on the project outcome after the actual project has been completed (See workbook 6 section 6.11)

Objectives as Requirements - very commonly but still rather worryingly, many students, on Engineering projects, seem to think that objectives are the same as application requirements. (See workbook 6 section 6.11)

Objectives as Benefits - less commonly but still rather worryingly, many students, on Engineering and study projects, seem to think that objectives are the same as benefits. For example, in a study project on CRM systems what one often finds in place of project objectives is a list of benefits of implementing CRM. Similarly, for Engineering projects we see objectives written as a set of benefits of using the application being built later on in the real world. (See workbook 6 section 6.11)

9.8.4 Literature Review

In research the literature review is regarded as being essentially preparation of the mind. It follows, that to be serious about this step one has to be evaluatory and reflective as you read and write. Ideally one needs a strong theme which is used to weave an expository and exploratory discourse that unites and builds one's understanding and ideas with what has been written by other authors on one's core topic area.

For projects a full literature review is only needed in the case of a study project. For Engineering all that is required is a thorough overview of the application area. So for example, if an application were about Insurance brokerage then all that is required is a description of what brokerage is but only to the level necessary to understand the requirements. With this aim in mind: (See workbook 5 but section 5.2 and 5.6 should be studied with care)

Structure - many reviews were poorly structured and one often felt that the students had just written down the material as it occurred to them without any thought as to a wider readership.

Theme - often there was no detectable theme connecting the various sections of the review narrative and a reader would therefore be forced to guess and see how all the various elements were connected.

Value Added - the most common flaw was to see a review that was entirely or almost entirely made up of quotations, paraphrases or summaries so that the 'hand' of the student was not detectable anywhere in the work. Such work is not evaluatory and gives no indication whatever that the student has learned anything of value or indeed anything at all. It is often the case that one feels the student has no notion of the literature being a driver that may mean they have to accept new knowledge, gain further experience, modify existing knowledge or even abandon what they thought was sacrosanct and sadly no belief that their own views and experiences are also important.

Citation Style - two things are evident here. Firstly, one finds that too often citations are limited to the Literature Review. Secondly, the actual style used is very poor and commonly we see the form (Burk, 1992 p45) placed at the end of a sentence or paragraph. This is not acceptable and can only mean the whole paragraph has been paraphrased. The ONLY correct use of this bracketed style is in a passing reference to a text. (See workbook 8)

Worthless Quotes/Paraphrases - it is unfortunately only too common to see an appeal to some text or other for information that tells you either common knowledge or makes an obvious observation and so the citation is worthless and is representative of weak scholarship and laziness where a student is just trying to add a citation because he knows that such things are desirable. For example, quoting an author who says that "Object Orientation is now routinely used in software construction" is representative of common knowledge or quoting an authors who "says change is inevitable in organisations" is something that one might regard as obvious.

9.8.5 Research Design

These were often far from satisfactory and often read like a joke delivered without the punch line. The students are taught that essentially there are two phases. The first phase is the process used to get primary data items that are formed into a collection. Once the collection phase is completed we move on to the second phase of processing where the collection of primary data is processed to get an answer in the form expected. Particular points are:

Research Phases - In many case students were unable to distinguish the processing needed to get a collection of primary data and processing of the collection of primary data to get an outcome. It is quite common to see these two phases ignored or become competed muddled leading to a poor research outcome because the student loses his/her focus and often appear to have no clear idea what they are doing. The phases are:

Phase 1 - a process or processes used to define and create a primary data collection. It typically has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the data and present the data.

Phase 2 - a process or processes used to manipulate the collection of primary data to get the form of answer expected.

No Outcome - often it seemed as if the student had no idea what form of outcome to expect so when one looked at the processing there was no sense that the primary data was being transformed into the required form of outcome.

Primary Data - many students seem to have only a vague notion of what primary data is and will often, very often, confuse or think that primary data is the same as the method of collection. This confusion is often evident with some students thinking that only questionnaire data could possibly be primary data.

Primary Data Definition - Primary Data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

For example, one student took the definition and then read through an accounting system manual for his company and extracted all the functions and claimed that was primary data because he was going to use it to define what an accounts package should have by way of functionality but seemed unable to see that the manual had effectively done that already. (See workbook 6 section 6.6)

Research Method Justification - often students could not distinguish between Research Method and Data Collection Protocols. Research Methods are frameworks such as Case Study, Experiment, Action Research and so on. Collection protocols are based on: interview, questionnaire, observation, role playing, seminars, focus groups and so on. The sorts of justifications used are of the form "I have chosen case study because Saunders (2005, p92) said case studies are good... This is hopeless and implies no real thought. Justification must be built from a sound understanding of a particular Research Question, its expected form of outcome and the Primary Data needs and at least an overview of which method is likely to be best in a given situation. (see Workbook 7)

Practicality - many plans were over-complicated with students trying to use multiple methods and then ending up with masses of data they had no idea what to do with. There is only limited time and so students should be encouraged to focus on just one Research Method although of course several protocols may be involved.

Data Collections - in many cases all an examiner was able to see were results but often one simply could not tell if any primary data collection was involved and the results just seemed to appear 'out of the air'. The marking guide is quite specific and projects must be clear about both processed data and raw primary data collections. Without this we cannot feel confident that students have done any actual research. Typically, the collection of primary data is placed in an appendix and might be in the form of a summary table of questionnaires results or summarised transcripts. Correspondingly, the processed primary data collection is expressed as charts, graphs, tables, reports and so on in the body of the project report.

Processing - this is one of the most disappointing elements. Processing is all about transforming your collection of primary data into the form of outcome expected. Far too often all we see is the processing of individual primary data items with no attempt or very weak attempts to really supply an answer to the Research Question in the form that was specified.

Location - there were quite a few projects where it was more or less impossible to see where the primary data came from and often this was accompanied by a very ordinary set of results that could have been written by almost anybody with a superficial knowledge of the subject area.

9.8.6 Research Results Processing

There were some very good examples but often this section was very routine and very disappointing.

Repeating - it was very common to see a chart for example, displayed and then underneath the student simply repeated the data that was in the chart in words. Such a practice is worthless. What any data related narrative is supposed to do is to tell the reader what the data means and what implication it might have - that is we expect to see some analysis and evaluation of the data in terms of the Research Question.

Focus - the focus of processing the primary data is to create a kind of transformation that generates from the collection of primary data the expected project outcome - unfortunately, this aspect was often absent. Typically in a survey for instance we have page after page of charts analysing individual data items but no attempt to sum it all up and reach a conclusion based around the Research Question.

9.8.7 Evaluation and Conclusions

These sections in a lot of student work are indistinguishable. The reason there are two sections with marks attached is because:

Evaluation - here one focuses specifically on the project outcome and research methods - that is we evaluate our product (outcome) and the methods used to generate it. Notice here this is NOT about generating the outcome that would have been done in the research processing section

Conclusions - here the attempt is made to say what it all means - that is trying to generalize the findings. So for example, suppose the outcome is about the use of Agent technology in eCommerce web sites then in conclusions one might try to say what a particular project outcome means for any eCommerce site or in fact any website. In a similar kind of way, if a particular application had been built we might try to say whether it might be applicable in other situations or whether some features of the design can be transferred to all applications of that type.

9.8.8 Ignorance of Project Marking Criteria

Many students show an almost complete disregard for the way a project is marked and so often automatically lose marks. Students must therefore carefully study the marking forms so that they know what components are regarded as essential to any project and therefore carry marks. (See workbook 11 or 12 as appropriate)

10. WORKBOOK 10 – FORM: PROJECT SUBMISSION

This form **must** be completed and included in your project submission. If you are unable to tick every box then your work is not ready for submission. If boxes are ticked and it is subsequently found that the relevant element is not present it will be taken as a deliberate attempt to falsify the record and regarded as a fail.

Project Word Count		Exclude appendices. If maximum is exceeded marks may be lost or the project rejected
	The report length is within the stated guidelines (15,000 words maximum excluding appendices)	
	I have included all making elements indicated in workbook 11 Or 12 as appropriate and noted the marking guidance notes	
	I have studied the guidance notes on common project faults found in section 9.6	
	I have prepared two bound copies of all my project work including any separate appendices	
	I understand that I may use one or both sides of the paper when printing the report.	
	I have included a full contents list, table list and diagram list all numbered consistently	
	I have used good quality A4 paper, normally in portrait orientation with a weight between of 80 and 100gsm.	
	I have made sure that the pages are in the right order and none are missing	
	I have used MS word .doc format	
	I have formatted the front cover and title page as required and added the necessary plagiarism declaration.	
	All my text is single line spaced at 6 lines per inch/25.4 mm.	
	All my main text, including headings is in 12-point font (Arial Narrow is recommended)	
	All my text in tables and diagrams is 10-point font (Arial Narrow is recommended)	
	All main text is right and left justified	
	No headings at whatever level are indented	
	Headings are NOT followed by a blank line	
	Headings are in the same font and size as the main text but are shown in bold type	
	No numbered headings are orphaned (that is all heading must be followed by some text not immediately by another heading)	
	I have used a single blank line to separate paragraphs	
	All chapters and appendices are numbered sequentially (1, 2, 3,...)	
	All subsections are numbered (2.1, 2.2,...) and none of my sections numbers exceed three levels (1.2.1, 1.2.3 ...)	
	All my margins: (top, bottom, left and right) are 20mm	
	Pages have centred footers in 10-pt Arial Narrow: Page 12 of 97 - J.J. Letto HEMIS No. 567543 Submission Date: 2004/05	
	I have cited other people's work properly using the Harvard APA format	
	I have included all citations in my list of references	
	My abstract accurately summarises all of the report, not just parts of it	
	All my chapters and appendices start on a new page	
	I have included appendices, where appropriate, covering: project specification, Project Plan, Requirements document(s), design document, screen shots, source code, user documentation, test results, evaluation results, questionnaires, etc.	
	My supervisor has read each chapter as the work progressed.	
	My supervisor has read the whole report	
	I understand that indented sentences can be used where appropriate but bullets are not recommended (see 9.3.1)	
	I understand that page headers are not required	
	I understand that each of my chapters should start with an introductory section that explains what the chapter is about	
	I understand that each of my chapters should end with a summary and a helpful link to the next chapter	
	I have fixed a copy in .doc format of the project document and any appendices on floppy/CD/DVD to my project submission	
	All my primary data (including requirement data) is original to this study and collected by me for this specific project purpose	
	Engineering Projects only - I have included an executable file of my application on an attached floppy/CD/DVD	
	Engineering Projects only - Application Operating instruction are on the attached floppy/CD/DVD as well as in the appendix	
	Engineering Projects only – In my application I have not used illegal copies of any software or included any software where there is an expiry date which may render the application inoperable in the future.	
	Engineering Projects only - I understand that the copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If, and only if, this is not possible then I have included in my project a supervisor signed set of screen shots in the appendix confirming that he/she has viewed the application in action.	
Signature of Student.		Date.

11. WORKBOOK 11 – FORM: STUDY PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

STUDY STYLE		Postgraduate Project Marking Form						STUDY STYLE	
Name of Student							HEMIS No.		
Brief Project Title							Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion						Re-Work	New Topic	
Name: Supervisor									
Name: Marker									
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker		
Project Unit	PJ.NCC								
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected						
External Examiner	N	Y	Refer to the External Examiner (if "Y" add comment in section G)						
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit						
References: See Workbook 11 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes									
Section A - Marks for Planning and Preparation							Weight	Mark	
1.	Project specification, including project plan						5		
2.	Review of the topic area literature						15		
Sub-Total							20		
Section B - Marks for Project Introduction									
3.	Presenting problem and its exploration including the Research Question						5		
4.	Discussion of the project's scope, scale, aim and objectives						10		
Sub-Total							15		
Section C - Marks for Project Primary Data Research and Outcome Generation									
5.	Selection and justification of Research Method						5		
6.	Primary data collection plan including data specification						10		
7.	Primary data processing plan to get expected outcome						10		
8.	Presentation and discussion of the collection of Primary Data						10		
9.	Description and discussion of main project outcome						10		
Sub-Total							45		
Section D - Marks for Project Evaluation and Conclusions									
10.	Evaluation of the project outcome (Project Specific)						5		
11.	Evaluation of project practice (Project Specific)						5		
12.	Statement of conclusions and reflections (Project Generalisations)						10		
Sub-Total							20		
Section E – Qualitative Assessment matrix based on University Grade Criteria									
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words			
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless			
3.	Report structure	very poor	poor	satisfactory	good	excellent			
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report			
5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours			
6.	Project idea	trivial	easy	modest	challenging	Difficult			

7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Primary data collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Data processing	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
14.	Main project outcome	Worthless	obvious	useful	original	exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Study Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes found in Workbook 14.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.2 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the topic area literature

Reference: Workbook 5 section 5.2 and 5.6 in particular, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers and generally be focused on the central project topic. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and its exploration including the Research Question

Reference: Workbook 3 section 3.3 and 3.5.1, Workbook 6 sections 6.2, 6.6 and 6.7 and Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Research Question with a defined form of answer (project outcome). It is very common to see an expression of a problem as "my problem is to find a solution to..." or expressed in such a way that it is in effect a solution and such expressions are indicative of students who do not know what the problem is but nevertheless know what the solution is. Similarly, students who list multiple problems, have no Research Question (or a very poor one) and do not discuss the form of outcome expected are embarking upon projects where there is no clear focus and these typically fragment when it comes to the core research and one most often cannot find any clear project outcome later in the work. It is also useful at this stage if there is some indication of the Basic Activity for Generating Data (BAGeD) so that one can feel sure that the student is aware of what primary data they need in order to generate the intended outcome.

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.2 (example), Workbook 6 section 6.1 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition, expected form of outcome and Research Question all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Selection and justification of Research Method

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful choice of Research Method focused on resolving the stated problem theme. In practice this implies a consideration of primary data needs, location of primary data and the collection protocols that might be used. Markers should guard against rationales that amount to saying that some text book or other said method X or Y was good for certain kinds of scenario – that is copies of generalisations about Research Methods found in books do not amount to a rational for a specific research situation. Furthermore, markers need to feel confident that the student understands the distinction between a Research Method and the collection protocols used within them.

6. Primary data collection plan including data specification

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

This is a crucial stage in a research based project and markers must be confident that the plan is practical. A marker must look for a clear core activity represented by a statement about of BAGeD and that core activity should be surrounded by whatever other processes are needed to ensure reliable collection of the primary data. The whole primary data collection plan has four steps which must be visible in the project document: data definition, data location, data collection and how the whole collection of primary data is to be presented. Markers should also take care that the formation of a collection of primary data is not confused with the processing of it to get the stated project outcome.

7. Primary data processing plan and presentation of the expected outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for clear evidence that the student has taken the collection of primary data they obtained earlier in the project and now process that whole collection to get to a clear presentation of the project outcome. It is therefore important that markers can see what processes were applied to the collection of primary data to get the outcome – without this process visibility there is no evidence as to how the project outcome was actually obtained. Markers should be wary of processing plans that say such things as “I will look at the data” or “I will analyze the data” or “I will use SPSS” as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same data collection they could apply the same processes and get the same or at least a very similar outcome.
Markers should also be aware that very often students will often process individual data items – such as might be found on a questionnaire, but never get to a point where the stated project outcome is derived from the collection of data.
8. Presentation and discussion of the collection of Primary Data
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for visible signs of the collected primary data. The primary data collection is most often presented in tabular form in the appendix and might be displayed as graphs, charts, tables or diagrams in the main project document.
9. Expression and description of main project outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
The intended project outcome must be clearly visible – for example if the intended outcome is a model then that must be clearly shown in some acceptable form and be based on the processing plan outline in section 7. Markers must therefore take great care that the presentation of primary data and the processing of individual data items in the collection are not offered as a substitute for the student generating the intended project outcome.
Section D - Marks for Project Evaluation and Conclusions
10. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project outcome so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution (project outcome) or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project outcome. The section is not intended for vague thoughts about the topic but a considered evaluation of the project outcome when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
11. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate here. This section is important as this is where one expects to find some information on what the student has learned about the way they work and the tools they used. It is unfortunately often the case that students have very little idea about what they did apart from stating vague activities such as “look at”, “analyze” or “use SPSS” so without anything concrete to evaluate they resort to the routine and say “the survey process went very well” or “my case studies generated useful data” or else they simply ignore this form of evaluation altogether. Evaluation of project practice is difficult and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking ‘how did I do it’, ‘was it successful’ and ‘could I or should I on reflection have done it another way’. Additionally, one needs to be aware of any constraints involved, including time management and particular skills that might have impacted on the use of best possible practices.
12. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a project outcome was based on case studies and the outcome was a review of IT outsourcing in Hong Kong then here we might expect to see the student consider the outcome he obtained which refers to Hong Kong and then consider and discuss whether that outcome has wide applicability, for example, to China, South East Asia or even the world as part of a Global economy or is it just specific to that local situation. Essentially, one is asking what do the outcome ‘mean’ when set in a wider setting. It follows that the focus of awarding marks here is for project generalisations.
It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such as future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

12. WORKBOOK 12 – FORM: ENGINEERING PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

ENGINEERING STYLE		Postgraduate Project Marking Form						ENGINEERING STYLE	
Name of Student							HEMIS No.		
Brief Project Title							Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion						Re-Work	New Topic	
Name: Supervisor									
Name: Marker									
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker		
Project Unit	PJ.PEA								
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected						
External Examiner	N	Y	Refer project to the External Examiner (if "Y" complete section G)						
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit						
References: See Workbook 12 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes									
Section A - Marks for Planning and Preparation							Weight	Mark	
1.	Project specification, including project plan						5		
2.	Review of the application/product area and its client/business setting						10		
Sub-Total							15		
Section B - Marks for Project Introduction									
3.	Presenting problem and outline proposal						5		
4.	Discussion of the project scope, scale, constraints, aim and objectives						10		
Sub-Total							15		
Section C - Marks for Project Primary Data Research and Outcome Generation									
5.	Detailed requirements collection plan based on proposal						5		
6.	Analysis of requirements: functional, performance, technical and usability						5		
7.	Presentation, analysis and discussion of the design						10		
8.	Discussion of build process and design implementation						10		
9.	Application testing process and results						5		
10.	Implementation plans						5		
11.	Attributes of the project artefact (e.g. quality, reliability, etc)						10		
Sub-Total							50		
Section D - Marks for Project Evaluation and Conclusions									
12.	Evaluation of project product against requirements (project Specific)						5		
13.	Evaluation of project practice (project specific)						5		
14.	Statement of conclusions and reflections (project generalisations)						10		
Sub-Total							20		
Section E – Qualitative Assessment matrix based on University Grade Criteria									
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words			
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless			
3.	Report structure	very poor	poor	satisfactory	good	Excellent			
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report			

5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours
6.	Project idea	trivial	easy	modest	challenging	difficult
7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Requirements Collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Design Expression	no evidence	vaguely discernible	stated but not clearly	clearly stated	precise and clear
15.	Artefact Evaluation	worthless	obvious	useful	original	Exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Engineering Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.1 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the application/product area and its client/business setting

Reference: Workbook 5 section 5.2 and 5.6, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers. In Engineering projects the expectation is that the review will focus on the application area and be in enough detail to at least understand and gather the requirements. It is permitted to include technical material if they have a special or unusual significance to the application area but in so doing students must be aware that the routine inclusion of what at this level might be regarded as common knowledge in computing/IT will not attract any marks. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and Outline Proposal

Reference: Workbook 3 section 3.3 and 3.5.1 Workbook 6.2 and 6.5, Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Application Outline expressed as a functional description. It is very common to see an expression of a problem as "my problem is to find a solution to..." and this is indicative of students who do not know what the problem is but nevertheless know what the solution is. Students who list multiple problems, have no functional description (or a very poor one) are indicative of projects where there is no clear focus and these typically fragment when it comes to requirements gathering and often end in a very trivial application. Markers should be aware that students may avoid giving a functional description and instead offer a generic architectural one and this must be penalised as the student clearly does not know what function the application supplies

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.1 (example), Workbook 6 section 6.11, 6.9 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition and Application Outline all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Detailed requirements collection plan based on proposal

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful consideration of the Requirement Gathering process focused on obtaining sufficient information to build the intended application and resolve the stated problem theme. In practice this implies a consideration of application functions, location of requirements data and the collection protocols that might be used. Normally in research one would expect a rationale for the choice of Research Method but for Engineering projects it is taken for granted that the method is requirements gathering. Instead one should look for a clear focus on constructing a feasible and comprehensive requirements document based on the application outline. Furthermore, markers need to feel confident that the student understands the distinction between Requirement Gathering as a Research Method and the collection protocols used within it.

6. Analysis of requirements: functional, performance, technical and usability

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers must look for a clear Application Proposal and a requirements catalogue. Here one needs to see a discussion of the requirements to ensure they are credible (realistic), comprehensive, complete and stakeholders have been considered. One might also usefully consider the approach that was taken to gain them and whether they are of the form of strategic, tactical or operational.

7. Presentation, analysis and discussion of the design
Reference: Workbook 9 sections 9.6.5 and 9.6.6 and Workbook 7 section 7.9
Marks are awarded here for clear evidence that the student has taken the requirements obtained earlier in the project and processed them to get a suitable design. Therefore, markers must be able to see a clear link from requirements to design and where necessary observe how the requirements were processed. Markers should be wary of processing plans that say such things as "I will look at the requirements" or "I will analyze the requirements" as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same requirements they could apply the same processes and get the same or at least a very similar outcome.
8. Discussion of build process and design implementation
Reference: Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for a rational discussion as to what architecture, components, languages and tools and so on are needed to best implement the design. This discussion may also imply the various situation constraints have to be considered as well.
9. Application testing process and results
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers must look for evidences of a testing plan and a consideration of test results. Typically the plan and results are placed in the main project document in outline form with the details in an appendix. Often students will just discuss white or black box testing or regression testing or something similar but without any actual test plans or results – in such cases marks should not be awarded as these materials is considered common knowledge at this level – however brief references to it are permitted.
10. Implementation plans
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a comprehensive implementation plan – it need not be extensive or in minute detail but it should cover installation, user training, data conversion/loading, change over, user acceptance and hand-over.
11. Attributes of the project artefact (e.g. quality, reliability, etc)
Reference: none
The intended project application must be clearly visible and available to run directly from a disc or DVD. Markers are to award marks based on their perception of the general quality of the application if they were to put themselves in the place of a user. Assessment may then consider colour scheme, ease of use, operating instructions, presentation (does it look as if its finished), speed, etc.
Section D - Marks for Project Evaluation and Conclusions
12. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project application so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project application. The section is not intended for vague thoughts about the situation or application but a considered evaluation of the project application when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
13. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate. This is where one expects to find some information on what the student has learned, the way they work and the tools they used. It is often the case that students have very little idea what they did apart from being able to state vague activities such "look at" or "analyze" so without anything concrete to evaluate they resort to the routine and say "the survey process went very well" or "the UML modelling was straightforward" or else they simply ignore this form of evaluation. Evaluation of project practice is difficult because the student must ask searching questions related to process success and the notion of good and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way' or "what were my constraints".
14. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a an application was for eCommerce selling shoes it might be possible to ask what aspect of that application could be re-used to sell other product. It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

13. WORKBOOK 13 – FORM: PROJECT MARKING RECONCILIATION

The form shown below is included for reference only so that you can see how your project will be marked.

Project Mark Reconciliation Form		Final Agreed Mark (%)	
Name of Student			
Brief Project Title			
Name: Supervisor			
Name: Second Marker			
Name: 3rd Marker			
<p>Cause – in this box, describe, for each applicable section, why the marking disagreement occurred.</p> <p>Rationale – in this box, If a mark can be agreed, explain the rationale used to reach agreement. Please note that it is only necessary to agree the total mark for each section not individual category marks.</p> <p>Irreconcilable - If you cannot agree a mark leave rationale blank and it will be filled in by a third marker who will place a tick in the small square box.</p>			
Section A - Marks for Planning and Preparation		Agreed New Sub-Total	
Cause			
Rationale <input type="checkbox"/>			
Section B - Marks for Project Introduction		Agreed New Sub-Total	
Cause			
Rationale <input type="checkbox"/>			
Section C - Marks for Project Primary Research and Outcome Generation		Agreed New Sub-Total	
Cause			
Rationale <input type="checkbox"/>			
Section D - Marks for Project Evaluation and Conclusions		Agreed New Sub-Total	
Cause			
Rationale <input type="checkbox"/>			

14. WORKBOOK 14 – SUPERVISION AND MARKING GENERAL GUIDANCE NOTES

1. **Presented Work** - Marker's are reminded that any marks awarded must be solely based on the assessment of work presented within the mark categories listed on the mark forms. It is not permitted to award marks for "hard worker" or "tried very hard" or "was a good student" or any similar observation as there are no relevant mark categories and this kind of criteria is almost impossible to evidence.

When an Engineering artefact is presented it should be viewed in action to ascertain the mark for "Attributes of the Project Artefact". The copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If this is not the case then markers must assume that there is no evidence for the application and set the mark accordingly.

2. **Word Count** – on the project submission form there is a space for a word count (excluding appendices) and if this is exceeded then it is indicative of a deliberate attempt to go beyond recommendations and you may therefore find that it leads to laboured descriptions or inclusion of irrelevant material in the project document and you should therefore mark accordingly.
3. **Structure** – mark categories do not necessarily represent chapters in a project document and so Marker's need to be aware that a particular project may be structured in a way that does not correspond to the sequence presented on the mark forms (though it is recommended to do this when possible). However, all the elements on the marking form must be visible in the work presented.

Although it is recommended that the mark form sequences be followed in the project document that does not mean that there has to be a chapter for each mark category. Students, therefore, should be encouraged to merge sections in order to produce a concise document. For example, it is perfectly possible and reasonable to merge the two evaluation sections and conclusions into one chapter as long as the relevant mark elements are still visible.

4. **Appropriateness** - any work presented must be within the prescribed subject area for the course. If a marker suspects that this is not the case then they should consult with the relevant course leader for clarification. In such accepted cases markers must regard the primary data and its processing as not being appropriate and mark with that in mind.
5. **Evidence** - the project report or appendix must contain sufficient evidence that the core project research work has been done (not the literature review). That is, in the case of study project a marker must be able to see the primary data collection appropriately presented (usually in an appendix). In the case of Engineering projects it must be possible to see a suitable requirement document or catalogue (possibly in the appendix). Once the primary data is visible then it must also be possible to see how that data was transformed into the intended project outcome.
6. **Literature Support** - when marking Literature Reviews their content must be seen to be focused on the topic area and address clearly the associated problem theme without any irrelevant material with the intention of offering a concise discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (see section 5.1)
7. **Grade tables** - markers must be aware of the criteria associated with awarding a given overall mark as they may be required to justify it to the UAB in terms of the criteria stated in the table shown below.
8. **Process** – when marking it is important that the process used to get an outcome by the student is visible in the project document. In practice this means that it is possible to perform the following trace: presenting problem, discussion of how problem might be resolved, suggested form of project outcome, research design and execution, generation of stated outcome, evaluation and conclusions – viz:

Engineering – typically, the process starts with a business related or technical problem theme leading to a research plan for the collection and discussion of requirements and their transformation into a suitable design and associated architecture. From this there should follow a build, implement and testing process with the whole project completed with suitable project specific evaluations and conclusions containing generalisations.

Study – typically, the process starts with a business or strategic IT related problem theme leading to a research plan for the collection and discussion of primary data and its transformation into an outcome that would resolve or go some way to resolving the stated problem theme. The whole

project is then completed with suitable project specific evaluations and conclusions containing generalisations.

Marks	Master's Level Grade Criteria
70 – 100	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Excellent work - able to express an original reasoned argument in a lucid manner by reviewing & critiquing a wide range of material. Original, critical thinking based on outstanding insight, knowledge & understanding of material. Material contributes to current understanding & is of potentially publishable quality in terms of presentation and content ▪ Wide reaching research showing breadth & depth of sources
60 – 69	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Clear, balanced coherent critical & rigorous analysis of the subject matter. Detailed understanding of knowledge & theory expressed with clarity ▪ Extensive use of relevant & current literature to view topic in perspective, analyse context & develop new explanations and theories
50 – 59	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Detailed review and grasp of pertinent issues & a critical contextual overview of the literature. Thorough knowledge of theory and methods & uses this to underpin arguments and conclusions ▪ Confidence in understanding and using literature
40 – 49	<ul style="list-style-type: none"> ▪ Demonstrates grasp of key concepts & an ability to develop & support an argument in a predominately descriptive way with valid conclusions draw from the research ▪ Familiarity with key literature which is cited and presented according to convention ▪ Logical & clear structure, well-organised with good use of language and supporting material
0 – 39	<p>FAIL – Some knowledge of relevant concepts & literature but significant gaps in understanding and/or knowledge. Little attempt at evaluation, conclusions vague, ambiguous & not based on researched material. Limited or inappropriate research. Deficits in length, structure, presentation &/or prose.</p>

15. WORKBOOK 15 – FORM: UNIT FEEDBACK REPORT

This form may be used by you to feedback to the University your experiences in the courses. It is normally sent to your tutor at the end of the course.

Unit Level Feedback – Delivery Evaluation for Online Units										FF.2.3		Page 1 of 1	
This student feedback questionnaire is intended to help students provide constructive feedback to the unit lecturer.													
Student Name (Optional)										Cohort			
Unit Name													
Lecturer													
Q		→		Good		Place a ✓ to rate each factor from strongly disagree to strongly agree in one of the 5 boxes							
1						Chat sessions started promptly.							
2						Char sessions were structured usefully for learning.							
3						Chat content helped my understanding							
4						Chat Tutor handled student questions sympathetically							
5						Chat Tutor used helpful examples where necessary							
6						Chat Tutor answered session questions in a helpful manner.							
7						Chat sessions stimulated me to think beyond the material delivered.							
8						Chat topics were often related to real-world situations.							
9						Chat Tutor encouraged students to participate during the session.							
10						The Tutor was expert in the subject area.							
11						The written notes provided were helpful to my learning.							
12						The study pack Workbooks were helpful in my assessment preparation.							
13						The 5 milestone tests helped me to confirm my knowledge.							
14						Tutor responded in a timely fashion to discussion board questions.							
15						Tutor responded in a timely to my email communications.							
16						Tutor was sensitive to the problems of individual students.							
17						The assessed work stimulated me to think deeply about my project.							
18						Feedback on my progress was available.							
19						The topic approval process helped me think clearly about my project.							
20						Written assignment specifications were clear.							
						For Official Use Only							
General Comments:													

Example Complete Study Project Specification

Literature Review & Project Specification (Study) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2653)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Strategic IT Value

This work was based on trying to resolve or partly resolve the problem of low quality code leading to the need for costly re-work at later stages in the development cycle. The importance strategically of this work is that the outcome: a definition of new software metric will imply that it is possible to identify poor application code and this can be done at an early stage in the software development life cycle. The importance of this is that corrective action can be taken early in the development cycle and as a consequence costly re-work late in the cycle can be avoided or reduced. A secondary or added value element is that the results will allow the identification of good programming standards and this in itself will also lead to improvement and strategic advantage on all products delivered.

Literature Review (See Workbook 5 but note section 5.6 in particular)

Hiskett in his 1987 seminal paper on metrics defined several apparently useful metrics, the best known of which are 'program vocabulary' and 'program length' which are essentially metrics that count operators and operands and their usage in a given piece of code. Hiskett's metrics are easy to calculate but he was unable to show any strong correlation between his measures and program quality as defined by experts in the field. Similarly, Rogers and Hamerstein tried to use Hiskett's metrics as predictors of MTBF in accounting software but the results were inconclusive and no link could be found between the metrics and the type of software (functionality), accounting in this case, and the metric used.

Garlick, Sheene and Southwood (1999, p450) attempted a new approach that involved the notion of similarity, which they called planar similarity – that is two programs could be defined as similar because: they are written in the same language or they perform similar functions or they were written to the same standards or they are written to the same specification or they were written by the same team or finally they perform the same function. Their work is aptly summed up in the opening paragraph of their paper:

"The nature of any true measurement is easy repeatability and this implies that the style of measurements form a suitable metric space. This means that we need to define the nature of the similarity before we define a measure. In principle this is simple since it is easy to name the similarities but in practice it has been difficult to articulate a precise definition."

The similarities described above deserve further explanation but here only two of them in combination are used: similar language and similar or same specification. Similar language is easy to understand but at first glance it would seem that if two different programs are written to the same specification they are bound to be the same. However, after a little thought, it is obvious that if two different people write two different programs to the same specification the programs are certain to be different in many respects. It follows that the basic, though loose, hypothesis is that if planar similarity can detect a similarity (alternatively difference) in these programs - written to the same specification but by different people - it might be possible to use planar similarity to detect differences between two or more programs against any defined mode of similarity. Conversely, if it cannot be shown that a similarity exists between two or more programs written to the same specification then there is no hope whatever of showing any other kind of similarity with this metric.

Two final points need to be considered: what exactly is meant by software quality and why would a similarity measure be a good indicator of quality? To answer the first question we have only to refer to Kitchenham's 1998 paper where she defined five kinds of quality, briefly:

Transcendent View – quality is a kind of innate excellence, something felt rather than seen.

Product Based View - quality is related to the content/attributes of the product.

User View – quality is seen as equivalent to fitness for purpose.

Manufacturing Based View - quality is equated with conformance to specifications.

Value Based View - provide product at an acceptable price and conformance to a specification.

In this study the transcendent view was the one chosen as the basis of the definition of quality. The meaning of this view is defined by experts in the field – that is, can an expert in, say, Java programming make a judgement as to whether a given piece of code is good or bad – well, here it is argued that such an expert can and does such tasks routinely. Curiously there is very little literature on this idea of expert opinion within the software community but Gavin as early as 1978 touched on the subject. However, it is a reasonable conjecture and it will be used in this study – interestingly, if it can be shown that planar similarity can detect similarity (or equivalently differences) then it would also support the conjecture that experts can judge software quality.

Research Design - Research Method

In this research it is aim an indication (loosely proving) the efficacy of the Planar Similarity metric within a given context. With this in mind simple experimental procedure will be used as described below. (See Workbook 7)

Research Design: Primary Data Collection Process

This part of the research design is solely concerned with constructing a reliable primary data collection for later processing into the report outcome defined earlier.

Basic Activity for Generating Data

The basic idea is to compare a new piece of code with an existing piece that is known to be sound and calculate a series of metrics each one that might highlight any differences and so indicate an outlier. (See Workbook 6 section 6.8, and 6.9)

This study will define 20 software metrics which will be calculated automatically for each sample programme. The metrics that form the primary data collection for this research will be such things as: function density, function count, cyclomatic complexity, data associations, decision count, decision density, number of variables, number of function calls, etc. (see Workbook 6 section 6.6)

To set up this experiment three computer program specifications will be drafted with the students working in 'C++'. The specifications will be written so that the defined software application is, in each case, of a different application style and progressively more difficult. An expert in 'C++' will produce a set of generics to match the requested programmes types – it should be noted that a generic is an outline or skeleton of certain kinds or classes of program.

Location – The sample frame is all first year students on computing courses at Portsmouth University. This is around 350 students and my calculated sample size is 200 students, however, since the data collection process is automatic all 350 students will be used in this study.

Collection Protocols – students will be given the application relevant generics and the specifications and asked to write three computer programs of increasing complexity, one in each of three semesters and deposit their completed programmes into a drop-box. This is a large data set and for practical reasons an application will be written that will process each student program so that metrics may be calculated automatically and stored in a suitable electronic file. (See Workbook 6 section 6.6.1)

Primary Data Collection Presentation

The sets of primary data will be available in the project document appendix and will be presented in tables where the rows represent the sample programs (one row for each sample) and the 20 columns the metric values.

Research Design: Processing and Presentation

This part of the research plan will take the whole collection of primary data and manipulates it to get the expected outcome form, which was a demonstration in the form of a report.

Design of Pre-Processing for Primary Data Collection (Workbook 6 section 6.6.3)

The metric data sets will be read directly from the files produced in the collection phase and then statistically processed to define a similarity measure for each program using principal component analysis and multidimensional scaling. The outcome of this processing will be pairs of values, one pair for each sample program, suitable for plotting in two dimensions.

Design for Results Presentation

The pair of values from the first processing round will be plotted in two dimensions, together with the results for the generics producing three graphs one for each program specification.

Design for Generating the Intended Project Outcome

Once the graphs are available it is then a simple matter to look for outliers in particular and attempt to explain their distance and orientation from the generic and other programs in the group by a close examination of the underlying program code that gave rise to it.

The contention is that similar programs will cluster together and ones that are different (even though the specification was the same) will show up as outliers and can be identified and examined to see why that difference occurred. It is hoped that the results will be similar for all three program specification involved and hence demonstrate that planar similarity is an effective software metric. Hence it will be possible to review the results and generate my report on Planar Similarity that contains my overall findings and evidence on its utility.

Finally, the study will rely on the ability of experts to judge quality in software. This judgement is exemplified in the production of exemplar or generic programs. Garlick (2003, p98) has written extensively on this subject and the work is well known and will not be fully reviewed here. However, it is possible to define classes of program modules - validation, input, calculation, reporting and so on - it follows, that using the idea of similarity it is useful to create a standard or *generic* program or module for each class. Such a program can then act as a base line for all planar distances related to its application class and hence be a measure of similarity (or difference).

Using Garlick's idea we can let experts define our generic and then use that to compare with other programs - if we declare a difference then in simple terms we need to look at that program because it might be of poor quality and conversely if we declare no difference then we can fairly conclude that the program is sound.

Project Specification (please start on a new page)

Project Title - Quality Control in Program Development - A Possible Strategy (Workbook 6 section 6.13).

Situation Overview and Problem Setting

The research is set in The University of Portsmouth with the School of Information Systems. In that context it will focus on the programs produced by first year computing undergraduate students.

Presenting Problem Definition

The problem for developers is focused on knowing when code is robust and ready for release. (See Workbook 6 section 6.2 and 6.5).

Real-World Target

The benefit that would accrue in the real-world if this problem can be resolved or partially resolved is that developers can detect potential errors at the code stage and hence feel more confident about their product and therefore not risk costly development overruns and compensation claims from clients. (See Workbook 6 section 6.3)

Research Question

How can (interrogative) developers feel sure that software applications are ready for release (problem) in order to prevent costly overruns and client disappointment (target) by defining the planar similarity software measure (suggestion) by examining its efficacy in pinpointing software defects at the code stage (spotlight)? (See Workbook 6 section 6.7 and 6.9)

Intended Project Outcome and Actors

It is expected that the form of the answer arising out of this work will be a demonstration in the form of a report with graphical evidence that endorses the proposition that Planar Similarity is an appropriate software quality indicator in that outliers can be detected from application code and hence the target effects gained.

It is expected that the above report will be used by software developers to guide them in the design of generic program templates and in the testing phase and hence help to ensure that product confidence is heightened and cost overruns do not occur. (See Workbook 6 section 6.4 and 6.9)

Ethical Overview

There are no current users of the process being developed and at this stage there not seem to be any ethical consideration of importance. However, it is necessary to explain to the students supplying the sample programs the purpose of this study and assure them that none of this information will be used for assessment and allow them access to the results if they so wish.

If the target actors use this method then it would possibly expose programmers competences to managers and this may have a negative effects if it is seen not as an aid but as a kind of assessment of their abilities.

Aim

To report (activity) on the efficacy of the Planar Similarity measure (outcomes) using simple metrics as a means of finding outliers in program code (spotlight) and hence reduce coding errors leading to development cost reduction and client approval (target). (See Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3)

Objectives (see Workbook 6 section 6.11 and 6.11.2)

1. To model the application software construction process.
2. To report on appropriate simple and synthetic metrics that might be used as indicators of quality in application programming code.
3. To define a process that will extract the defined metrics for any piece of application code.
4. To document a suitable statistical process for reducing the metric values set to just two dimensions.
5. To analyse and report on the data, including outliers, and hence derive some general conclusions regarding the utility of the Planar Similarity metric.

References (See workbook 8)

JKM Quality Assurance Handbook (Company Confidential)

Garlick, F. J., (1993), Planar Similarity - A New Synthetic Metric, SQM, Elsevier, 1-85312-225-4

etc

Project Plan - Master Schedule expressed in weeks (You may assume that a project take about 18 weeks to complete)														
Dates are Mondays	March				April				May					etc
Event	6	13	20	27	3	10	17	24	1	8	15	22	29	etc
Literature Search														
Identify metrics														
Write Metric program														
etc														

Research Q = linking ~~Problem~~ ~~Target~~

Exercise 004b.01a – Finding a Basic Activity Word Spotlight

Exercise 1 - Write some notes to explain to fellow students what the following verbs might mean in practice. In the following word definitions I have added how they might be used in a BAGeD (data spotlight) statement and then suggested some possible pre-processing and later outcome processing stages. These examples are to help you understand the idea and gain some facility in its use - they are NOT templates so they MUST not be used thoughtlessly or as some kind of shortcut to you doing the real thinking work in your own project. The answers to the exercise will be expressed in a table as follows.

Word – this entry will give a concise definition of the word

WARNING – in the Research Methods course the following key words have a defined meaning and you MUST study the relevant entries in the notes and workbook. DO NOT assume that you automatically know what these mean otherwise you are likely to get into considerable difficulties.

Problem – this must define a single core problem for which you are going to find a solution route

Target – these are the effects that will be evident in the real world if the problem can be solved. It is permissible to list more than one effect but it is best to look for the principle one.

Outcome – this is the object you will generate as the final product of your MSc project. Possible outcomes are characterised by nouns so might be: reports, models, frameworks, policies, strategies, position papers, reviews, procedure description, best practice descriptions, dictionaries, lexicons, concordances, protocols, dossier, diagrams, charts, plans, etc.

Actor - It is normal when you define your outcome to say who the actor or actors are (meaning persons) who will use your defined outcome and to show that its use by them leads to the target effects

Research Question – this is a sentence expressed as a lucid question that connects the various features and expresses the direction of your research and summarises your whole project. The 6 elements are: interrogative, outcome, actor, problem, target and spotlight (data) - IO-APTS. The acronym IO-APTS is the correct order of these features in a sentence when the interrogative is "what" but for other interrogatives the order of features may need to change if you are to produce a valid sentence in English.

Possible interrogatives are: Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, s/are, and can.

Example – this entry will give an example of the use of the word in a BAGeD entry

Research Method – choosing a method will depend on many factors such as: context, time available, skills available, practicalities, access, reason for the study, what kind of outcome you want, cost, nature of the study quantitative/qualitative, scale, control, and sensitivity of the data and so on.

In this set of examples I give a suggested Research Method based on a rationale based largely on the basic purpose of the study. Basic purpose is usually assumed to provide as an outcome one of the following forms: express an understanding, an exploration, a description, an explanation, an improvement suggestion, build something or prove something. Common Methods and typical uses are:

Case Studies – useful when trying to understand a situation or practice

Vignettes - useful for exploring a situation in order to illustrate its major features

Action Research – useful when it is desirable to improve a situation by working within it

Experiments – useful when one is trying to prove or more usually indicate the truth of some proposition

Quasi-Experiments – as for experiments but the experiment can only be simulated

Surveys – useful when trying to describe a situation or effect

Biographies/History – useful when one wants to explore a situation in order to replicates it or improve it

Grounded Theory – useful when the area under study is barely understood but needs to be explored

Ethnography – useful when one wants to describe a situation of some kind involving behaviour

Requirements Gathering – useful when one wishes to build a real world object

Collection Protocol – this describes the means by which the primary data is actually collected: interview, questionnaire, observation, role playing, seminar, focus groups, document or record searching etc

Pre-Processing – this describes how the primary data in its raw collected form is processed into a structured collection of some kind.

Outcome Processing – this describes how the structured primary data collection is used to generate the intended outcome.

Account for – Explain and clarify something by giving reasons
Problem – inventory discrepancies leading to additional costs and delivery delays.
Target – reduced inventory cost and assured delivery times to customers
Outcome – set of recommendation expressed in a report
Actor – manager or managers responsible for inventory systems
Research Question – what (interrogative) revised inventory processes model (outcome) can be used by inventory managers (actors) to make changes to the current system in order to reduce or eliminate inventory losses (problem) so that costs are reduced and customer delivery times assured (target) by exploring and illustrating features of working practices in the current inventory system (spotlight).
BAGeD – the data spotlight will be to account for inventory discrepancies caused by current procedures
Research Method – in this case I am basically exploring this problem situation looking for illustrations of why discrepancies occur so that leads me to think that the method of Vignettes is the most suitable research model here.
Collection Protocol – record searching coupled with interviews .
Pre-Processing – this raw primary data collection will be pre-processed in order to structure the collection into the form of a catalogue of processes description each with a weakness assessment.
Outcome Processing – the catalogue produced in the pre-processing stage will be used to generate the outcome of a set of revised inventory processes using the company best practice model. This outcome will then be used to reform the way the inventory is managed and in so doing generate the target of reduced inventory losses, reduced costs and assured delivery times.

Analyse – Resolve something into its component part, or examine critically and minutely
Problem – delays and errors in generating audit request data
Target - reducing the time taken to generate the requested data and at the same time improve its accuracy.
Outcome – a report with recommendations
Actor - management
Research Question – what (interrogative) recommendations (outcome) can be generated and used by management (actors) to plan for the enhancement of current audit request procedures in order to ensure that delays and inaccuracies (problem) are eliminated (target) by a close examination the audit request protocols (spotlight).
BAGeD – the data spotlight will be to analyse the process used to extract data from the accounting systems for audit requests.
Research Method – here my primary need is to understand the audit request process and so I will treat each request as a small case study .
Collection Protocol – a form of role playing will be used to duplicated and simulate the request
Pre-processing – the extracted audit data and the request will be pre-processed into a matrix which will be formed by listing the request, process used, data sensitivity, classification and auditors assessment of data quality...
Outcome Processing – using a process model the data will be used to form a mapping of requests to consequence and hence derive a report with recommendations to management on the effectiveness of current audit processes. This outcome will then be used by management to make an informed decision on the way audit request are handled in the future and in so doing generate the target of reducing the time taken to generate the requested data and at the same time improve its accuracy.

Appraise - This is best thought of as something like forming an opinion about something. It might be quite simple such as forming an opinion as to whether something is good or bad but more often that not it's about forming an opinion about something after assessment or evaluation with regard to what can be done - so we might appraise whether a process for example should be left unchanged, modified or made redundant.
Problem - poor IT staff utilization as is apparent in increasing staff cost and high consultancy fees.
Target - increased management awareness on current IT staff utilization practices
Outcome - an assessment report on cost savings and other benefits that might accrue from a better utilization of existing staff.
Actor - departmental managers
Research Question - How can (interrogative) effective utilization of IT staff (problem) be achieved after an appraisal of staff utilization practices (spotlight) in order to generate an assessment report (outcome) for use by departmental managers (actor) to aid and inform them in job distributions so that a reduction in costs can be achieved based on a maximization of existing staff's abilities (target)?
BAGeD - the data spotlight will be to appraise the staff utilization practices with regard to IT technicians....
Research Method - my basic need here is explain the process so that leads me to believe that the histories method is most likely to give me a suitable research model.
Collection Protocol - document searching looking for example of utilization and how they were decided upon. It may be necessary to supplement this with linked interviews .
Pre-processing - the raw primary data will be catalogued into groups based on a manager's assessment of each employee focused on the current company standard payroll scales.
Outcome Processing - the grouped utilization practices and managers assessment will be analysed using an in-house workflow model to derive an assessment report of possible cost savings and other benefits that might accrue from a better utilization of existing staff. This outcome will then be used to brief departmental managers in order that the target of increased management awareness on current IT staff utilization practices is achieved in preparation for the bi-annual leadership meeting where this problem theme will be discussed.

Assess - Determine the value of something. Similar to evaluation but it is often useful to think of evaluation as a qualitative process and assessment as a quantitative one.
Problem - suspected under use of the new CRM system because some processes may have been inadvertently duplicated within the vestigial manual elements from the old system.
Target -
Outcome -
Actor -
Research Question -
BAGeD - the data spotlight is to assess the impact of effectively duplicate processes on the overall operation of the CRM systems in relation to potential cost saving.
Research Method - there are expected to many processes involved and it seems appropriate here to use case studies because I need to understand why these duplicate processes co-exist.
Collection Protocol - document search to obtain the processes followed up by observation of the process assisted by interviews .
Pre-processing - the various duplicate or almost duplicate processes with classified into a list by their expected impact on overall system efficiency using a standard model based on the factors: utility, process cost, training commitment,
Outcome Processing - to obtain the outcome of a list and rationale for suspected redundant processes that can be removed from the system each process will be reviewed by a seminar panel of relevant managers. This outcome will then be used by area managers to decide what vestigial processes can safely be removed without affecting company throughput and in this way generate the target of increased effectiveness centred on the full use of the new CRM system.

Catalogue – This means to create an ordered collection of some sort where there is a logical order and the essence of the task is to enumerate and describe.
Problem – variable tele-worker productivity in software development
Target –
Outcome –
Actor –
Research Question –
BAGeD – the data spotlight is to catalogue the stress effects imposed on tele-workers in a fast moving software development market.....
Research Method – here I want to explore this area so I am going to focus on Biographies and trace worker activities.
Collection Protocol - a questionnaire will be used to look for interesting or unusual candidates to interview and trace their CV and work activities by means of a form of document searching .
Pre-processing – the interview and document data be processed using common text processing ideas to classify and prioritise the main stress effects and presented as standardised short biographies .
Outcome processing – based on the biographies a worker stress report will be prepared for management with an assessment of possible productivity impacts. This outcome will then be used by project managers to balance workloads based on the various stress factors uncovered in the report and hence generate the target of assured worker productivity level.

Collect – This is very simple as all one does is to identify the data and literally collect it as you see it. So if I were looking for SPAM instances then as soon as I find one I just file the whole SPAM email away for later processing.
Problem – customer complaints about delays in resolving problem via the help desk
Target –
Outcome –
Actor –
Research Question –
BAGeD – the data spotlight will be based on collecting help desk work requests and their associated actions that have been delayed for more the 48 hours...
Research Method – this is a potentially large population so for practical reasons I will use the survey format as I feel I am mainly trying to describe this situation.
Collection Protocol – effectively the protocol is document searching where we one extract the above information from the help desk log.
Pre-processing – classify the work requests into a prioritised list by: operative, system and action with a final assessment by the relevant manager of the main cause of the delay.
Outcome processing – the prioritised list will be used to generate an action plan to deal with identified common causes of delay with a view to revising the current help desk work model. This outcome will then be used by the systems team to focus the help-desk re-building process and hence it is hoped generate the target of a more efficient and reliable service.

Compare - Look for similarities between one or more things.
Problem - apparent mismatches between company needs and programming staff recruited
Target -
Outcome -
Actor -
Research Question -
BAGeD - the data spotlight is to compare IT recruitment guidelines with current company tasks and their implementations
Research Method - since this is largely looking at what might be called historical data it seems worthwhile to use histories as the most suitable method
Collection Protocol - the essential task here is by a process of document searching as one compares the existing guidelines with the defined task specifications.
Pre-processing - none as a suitable list may be constructed at the collection stage by just using the guideline indices.
Outcome processing - the list will be processed to obtain a set of recommendations on a revised set of guidelines that better reflect company needs as found in the required tasks. The principle processing mechanism will be to use the existing task cost structures and the company staffing policy to arrive at the new guidelines . This outcome will then be used by team leaders and heads of department to focus their staffing needs in software development into an accurate and lucid job descriptions and hence generate the target of reduced recruitment costs and accurate selection of new staff to fit the required job profiles.

Compile - similar to list but here the implications is your are searching many sources and having to make decisions in the process
Problem -
Target -
Outcome -
Actor -
Research Question -
BAGeD - the data spotlight will is to compile
Research Method -
Collection Protocol -
Pre-processing -
Outcome processing -

Exercise 004b.01a – Finding a Basic Activity Word Spotlight

Exercise 1 - Write some notes to explain to fellow students what the following verbs might mean in practice.

In the following word definitions I have added how they might be used in a BAGeD (data spotlight) statement and then suggested some possible pre-processing and later outcome processing stages. These examples are to help you understand the idea and gain some facility in its use - they are NOT templates so they MUST not be used thoughtlessly or as some kind of shortcut to you doing the real thinking work in your own project. The answers to the exercise will be expressed in a table as follows.

Word – this entry will give a concise definition of the word
WARNING – in the Research Methods course the following key words have a defined meaning and you MUST study the relevant entries in the notes and workbook. DO NOT assume that you automatically know what these mean otherwise you are likely to get into considerable difficulties.
Problem – this must define a single core problem for which you are going to find a solution route
Target - these are the effects that will be evident in the real world if the problem can be solved. It is permissible to list more than one effect but it is best to look for the principle one.
Outcome – this is the object you will generate as the final product of your MSc project. Possible outcomes are characterised by nouns so might be: reports, models, frameworks, policies, strategies, position papers, reviews, procedure description, best practice descriptions, dictionaries, concordances, protocols, dossier, diagrams, charts, plans, etc.
Actor - It is normal when you define your outcome to say who the actor or actors are (meaning persons) who will use your defined outcome and to show that its use by them leads to the target effects
Research Question – this is a sentence expressed as a lucid question that connects the various elements and expresses the direction of your research and summarises your whole project. The 5 elements are: spotlight (data), problem, interrogative, target and suggested outcome (SPITs). There is no rule about how to combine these 5 elements but typically a sentence with the sequence: IPSsT.
Example – this entry will give an example of the use of the word in a BAGeD entry
Research Method – choosing a method will depend on many factors such as: context, time available, skills available, practicalities, access, reason for the study, what kind of outcome you want, cost, nature of the study quantitative/qualitative, scale, control, and sensitivity of the data and so on. In this set of examples I give a suggested Research Method based on a rationale based largely on the basic purpose of the study. Basic purpose is usually assumed to provide as an outcome one of the following forms: express an understanding, an exploration, a description, an explanation, an improvement suggestion, build something or prove something. Common Methods and typical uses are: Case Studies – useful when trying to understand a situation or practice Vignettes - useful for exploring a situation in order to illustrate its major features Action Research – useful when it is desirable to improve a situation by working within it Experiments – useful when one is trying to prove or more usually indicate the truth of some proposition Quasi-Experiments – as for experiments but the experiment can only be simulated Surveys – useful when trying to describe a situation or effect Biographies/History – useful when one wants to explore a situation in order to replicates it or improve it Grounded Theory – useful when the area under study is barely understood but needs to be explored Ethnography – useful when one wants to describe a situation of some kind involving behaviour Requirements Gathering – useful when one wishes to build a real world object
Collection Protocol – this describes the means by which the primary data is actually collected: interview, questionnaire, observation, role playing, seminar, focus groups, document or record searching etc
Pre-Processing – this describes how the primary data in its raw collected form is processed into a structured collection of some kind.
Outcome Processing – this describes how the structured primary data collection is used to generate the intended outcome.

Account for – Explain and clarify something by giving reasons
Problem – inventory discrepancies leading to additional costs and delivery delays.
Example – My BAGeD will be to account for inventory discrepancies caused by current procedures
Research Method – in this case I am basically exploring this problem situation looking for illustrations of why discrepancies occur so that leads me to think that the method of Vignettes is the most suitable research model here.
Collection Protocol – record searching coupled with interviews .
Pre-Processing – this raw primary data collection will be pre-processed in order to structure the collection into the form of a catalogue of processes description each with a weakness assessment.
Outcome Processing – the catalogue produced in the pre-processing stage will be used to generate the outcome of a set of revised inventory processes using the company best practice model. This outcome will then be used to reform the way the inventory is managed and in so doing generate the target of reduced inventory losses, reduced costs and assured delivery times.

Analyse – Resolve something into its component part, or examine critically and minutely
Problem – delays and errors in generating audit request data
Example – My BAGeD will be to analyse the process used to extract data from the accounting systems for audit requests.
Research Method – here my primary need is to understand the audit request process and so I will treat each request as a small case study .
Collection Protocol – a form of role playing will be used to duplicated and simulate the request
Pre-processing – the extracted audit data and the request will be pre-processed into a matrix which will be formed by listing the request, process used, data sensitivity, classification and auditors assessment of data quality...
Outcome Processing – using a process model the data will be used to form a mapping of requests to consequence and hence derive a report with recommendations to management on the effectiveness of current audit processes. This outcome will then be used by management to make an informed decision on the way audit request are handled in the future and in so doing generate the target of reducing the time taken to generate the requested data and at the same time improve its accuracy.

Appraise – This is best thought of as something like forming an opinion about something. It might be quite simple such as forming an opinion as to whether something is good or bad but more often that not it's about forming an opinion about something after assessment or evaluation with regard to what can be done - so we might appraise whether a process for example should be left unchanged, modified or made redundant.
Problem – poor IT staff utilization as is apparent in increasing staff cost and high consultancy fees.
Example – My BAGeD will be to appraise the staff utilization practices with regard to IT technicians....
Research Method – my basic need here is explain the process so that leads me to believe that the histories method is most likely to give me a suitable research model.
Collection Protocol – document searching looking for example of utilization and how they were decided upon. It may be necessary to supplement this with linked interviews .
Pre-processing – the raw primary data will be catalogued into groups based on a manager's assessment of each employee focused on the current company standard payroll scales.
Outcome Processing – the grouped utilization practices and managers assessment will be will be analysed using an in-house workflow model to derive an assessment report of possible cost savings and other benefits that might accrue from a better utilization of existing staff. This outcome will then be used to brief departmental managers in order that the target of increased management awareness on current IT staff utilization practices is achieved in preparation for the bi-annual leadership meeting where this problem theme will be discussed.

Assess - Determine the value of something. Similar to evaluation but it is often useful to think of evaluation as a qualitative process and assessment as a quantitative one.
Problem – suspected under use of the new CRM system because some processes may have been inadvertently duplicated within the vestigial manual elements from the old system.
Example – My BAGeD is to assess the impact of effectively duplicate processes on the overall operation of the CRM systems in relation to potential cost saving.
Research Method – there are expected to many processes involved and it seems appropriate here to use case studies because I need to understand why these duplicate processes co-exist.
Collection Protocol – document search to obtain the processes followed up by observation of the process assisted by interviews .
Pre-processing – the various duplicate or almost duplicate processes with classified into a list by their expected impact on overall system efficiency using a standard model based on the factors: utility, process cost, training commitment,
Outcome Processing – to obtain the outcome of a list and rationale for suspected redundant processes that can be removed from the system each process will be reviewed by a seminar panel of relevant managers. This outcome will then be used by area managers to decide what vestigial processes can safely be removed without affecting company throughput and in this way generate the target of increased effectiveness centred on the full use of the new CRM system.

Catalogue - This means to create an ordered collection of some sort where there is a logical order and the essence of the task is to enumerate and describe
Problem – variable tele-worker productivity in software development
Example – My BAGeD intension is to catalogue the stress effects imposed on tele-workers in a fast moving software development market....
Research Method – here I want to explore this area so I am going to focus on Biographies and trace worker activities.
Collection Protocol - a questionnaire will be used to look for interesting or unusual candidates to interview and trace their CV and work activities by means of a form of document searching .
Pre-processing – the interview and document data be processed using common text processing ideas to classify and prioritise the main stress effects and presented as standardised short biographies .
Outcome processing – based on the biographies a worker stress report will be prepared for management with an assessment of possible productivity impacts. This outcome will then be used by project managers to balance workloads based on the various stress factors uncovered in the report and hence generate the target of assured worker productivity level.

Collect - This is very simple as all one does is to identify the data and literally collect it as you see it. So if I were looking for SPAM instances then as soon as I find one I just file the whole SPAM email away for later processing.
Problem – customer complaints about delays in resolving problem via the help desk
Example – My BAGeD will be based on collecting help desk work requests and their associated actions that have been delayed for more the 48 hours...
Research Method – this is a potentially large population so for practical reasons I will use the survey format as I feel I am mainly trying to describe this situation.
Collection Protocol – effectively the protocol is document searching where we one extract the above information from the help desk log.
Pre-processing – classify the work requests into a prioritised list by: operative, system and action with a final assessment by the relevant manager of the main cause of the delay.
Outcome processing – the prioritised list will be used to generate an action plan to deal with identified common causes of delay with a view to revising the current help desk work model. This outcome will then be used by the systems team to focus the help-desk re-building process and hence it is hoped generate the target of a more efficient and reliable service.

Compare - Look for similarities between one or more things.
Problem - apparent mismatches between company needs and programming staff recruited
Example - My BAGeD is to compare IT recruitment guidelines with current company tasks and their implementations
Research Method - since this is largely looking at what might be called historical data it seems worthwhile to use histories as the most suitable method
Collection Protocol - the essential task here is by a process of document searching as one compares the existing guidelines with the defined task specifications.
Pre-processing - none as a suitable list may be constructed at the collection stage by just using the guideline indices.
Outcome processing - the list will be processed to obtain a set of recommendations on a revised set of guidelines that better reflect company needs as found in the required tasks. The principle processing mechanism will be to use the existing task cost structures and the company staffing policy to arrive at the new guidelines . This outcome will then be used by team leaders and heads of department to focus their staffing needs in software development into an accurate and lucid job descriptions and hence generate the target of reduced recruitment costs and accurate selection of new staff to fit the required job profiles.

Compile - similar to list but here the implications is your are search many sources and having to make decisions in the process.
Problem -
Example - My BAGeD is to compile
Research Method -
Collection Protocol -
Pre-processing -
Outcome processing -

Contrast - Look for differences between one or more things.
Problem - apparent mismatches between company needs and programming staff recruited
Example - My BAGeD is to contrast IT re recruitment guidelines with current company tasks
Research Method - since this is largely looking at what might be called historical data it seems worthwhile to use histories as the most suitable method
Collection Protocol - the essential task here is by a process of document searching as one contrast the existing guidelines with the defined task specifications.
Pre-processing - none as a suitable list may be constructed at the collection stage by just using the guideline indices.
Outcome processing - the list will be processed to obtain a set of recommendations on a revised set of guidelines that better reflect company needs as found in the required tasks. The principle processing mechanism will be to use the existing task cost structures and the company staffing policy to arrive at the new guidelines. This outcome will then be used by team leaders and heads of department to focus their staffing needs in software development into an accurate and lucid job description and hence generate the target of reduced recruitment costs and accurate selection of new staff to fit the required job profiles.

Criticise - Make a judgement, backed by a discussion of the evidence or reasoning involved, about the merits of theories, opinions.
Problem - apparent bottlenecks in the repayment system causing customer complaints and miss-payments
Example - My BAGeD will be to form a critique of each stage of the current repayment work flow with regard to IT usage....
Research Method - as my main aim here is to improve the flow in some way I have decided to use Action Research
Collection Protocol - observation based on the workflow definitions will be the main collection vehicle here.
Pre-Processing - this will look for outliers and clusters in the critique summaries and form them into a matrix in a prioritised order.
Outcome Processing - this will be in two stages. The first stage will look at outliers as they are normally indicative of underlying problems themes. The second stage will look at clusters as this implies similarity and that may point to where future IT deployments may best be sited. These two sections will then be used to generate the outcome of a set of process cycle synthetic metrics that can be used by finance mangers to continually monitor the repayment cycle in the future and hence generate the target of functional repayment cycle which is reliable and verifiable

Define - State the exact meaning you are attaching to a word, phrase, idea, process etc
Problem – apparent transaction losses
Example – My BAGEd is to define the state of each logged transaction within the scope of the current network transmission protocol
Research Method – this study will look at a large number of transactions and the essential method is therefore a survey
Collection Protocol – transactions data will be extracted automatically from the log by means of a software application. The software will also tag the various transaction types according to metrics defined in the literature to form a matrix of transaction definitions.
Pre-Processing – none as a structured collection will be available via the automate collection stage
Outcome Processing – the processing will automatically scale the data and display it in graphical form and of particular interest is transactions that might be regarded as outliers as they may be anomalous and point to processing sequences or other error types. Once the outliers are known it will be possible to produce as an outcome a report on verifiable metrics that can be used by monitoring software to predict which transactions are likely to cause process cycle difficulties and hence remedies can be sought in order to achieve the target of reduced transaction losses.

Describe - This may be used freely to describe in detail situations, events, opinions, feelings and so on.
Problem – lack of trust in security checking
Example – My BAGEd is to describe differences in network penetration test results carried out over several test periods.
Research Method – since we are essentially looking at historical data the method of histories will be used
Collection Protocol – document searching coupled with interview with systems administrators
Pre-Processing – the various discrepancies uncovered will be classified into severity levels and presented in a list format with administrator comments and a description of why it might have been missed on the previous test cycle.
Outcome Processing – Using the structured primary data set and the standard workflow model used in the testing suite attempts will be made to identify test scope factors that may have allowed faults to be overlooked and hence expose the network to unnecessary risk and hence generate the outcome of a revised scope of work and workflow model . This outcome will then be used by the outsourced security company team to adjust their testing suite so as to achieve the target of a security assured network.

Differentiate - Look for elements that would clearly differentiate between two or more things
Problem – poor IT utilization amongst middle level managers
Example – My BAGEd is to explore the cultural milieu in which managers of an organisation exist by differentiating various cultural elements that are present.
Research Method – in this I feel I need to immerse myself in the day to day life of managers in order to understand how that milieu might point to how IT training might be used by them and this makes me think of the research method of Ethnography .
Collection Protocol – this is a slightly sensitive area so it seem best to use observation based on spending long sessions within the managers department coupled with informal interviews
Pre-Processing – the raw primary data will be in the form of a mixture of short and long notes plus some formal interview transcripts as well as some video and photographic information. With the rich information base an attempt will be made to extract typical ethnographic elements such as: behaviours, structures, functions, roles, politics and communication styles. The extracted data will be carefully organised into a concordance within these categories.
Outcome Processing – using the structured primary data collection I will attempt to match cultural themes found within a manager's department with a training mode that might be best suited for that culture. The basis of the matching will be to use the 5 stage learning model developed by Garlick (1999) so that in essence we link learning progression to its cultural suitability. The outcome will be presented as an IT training plan and used by the manager's forum to adjust their personal training portfolio so as to achieve the target of higher IT utilization leading to more effective middle level management.

Discuss - Explain something by giving two sides of the argument
Problem – non IT personnel are reluctant to engage in computer user training
Example – My BAGeD is to discuss the function of IT training for non-IT personnel.
Research Method – this is essentially exploratory and it therefore seems best given the wide diversity of opinion that is likely to emerge to use the survey method.
Collection Protocol – a presentation will be made in seminar sessions and this will be followed by open discussion . Although this is a survey I have chosen this method as I want it to be a learning experience for all involved as well so in effect I will be looking to see if the seminar assists in forming opinions.
Pre-Processing – the seminar discussion notes will be structures by looking for the usual text processing elements such as: common threads, outliers, labelling, etc and formed into a catalogue .
Outcome Processing – the outcome is to be a position paper outlining a new training initiative and this will be generated by looking at the elements identified in pre-processing and knowing these have emerged from a sample the attempt will be made to say what it might mean for the whole company - can it apply to the whole company, is there some important element in this theme that has much wider implications, is there a principle that can be established, can I construct a theory and so on. The position paper outcome will be presented to company and training management with a view to informing them of the general feelings and desires of the wider non-IT workforce so that the target of construction of future training plans and personal training portfolios that better fit with worker needs and aspirations

Evaluate - In some cases one might want to look at events or people or processes in order to form an evaluation and that collection of (usually) small evaluations form our primary data.
Problem – unemployed people's disappointment in their inability to locate an appropriate job
Example – The BAGeD will be to evaluate the elements functioning negatively and positively in job searches.
Research Method – I am looking for the various factors that might be involved in job searching. Many of these will of course be well known such as qualification or skills but there may be many other that are not so obvious such as ethnicity, age, sexual orientation to name but a few. With this in mind I intend to explore this area looking for suitable illustrations of these factors and how they acted negatively or positively with regard to obtaining employment and so I feel the method of Vignettes is most likely to be valuable here.
Collection Protocol - My procedure will be to interview jobless 18-25 year olds (plenty can be found in job centres) in a defined inner city to collect illustrations of successful and unsuccessful job searches.
Pre-Processing – the interview transcripts will contain what amounts to suitable illustrations so these will be extracted and standardised based on a simple job seeker profile into a portfolio of successful and unsuccessful job searches illustrations.
Outcome Processing – using the illustration portfolio a protocol will be devised that when coupled with a standard job seekers profile can be used to enhance a web search for suitable employment opportunities. The outcome of a protocol and linked profile will be made available to job seekers and web job search system providers in order that the target of effective and satisfying web searches can be achieved.

Examine - Look carefully at the details of an argument, theory, or plan etc
Problem – frustration at the apparent time wasted on electronic correspondence
Example - The BAGeD will be to examine the various activities involved in the electronic correspondence process such as e-mail, fax, documents, photos, electronic forms, document and imaging process, accessing of images, routing/delegation functions according to the work flow process.
Research Method – there are several main areas and I need to form a clear understanding of the various technologies and processes so I will use the method of case studies and treat each communication area as a case study.
Collection Protocol – in this study I want to collect various communications samples and the practices associated with them in several areas and it seem best to do this by a series of observations and interviews with selected personnel from various levels in the company.
Pre-Processing – the collection phase will generate a large raw data set consisting of artefacts (samples provided in the interviews) and activity descriptions. It seems best therefore to organise these into a communication area/activity matrix linked to an artefact sample catalogue .
Outcome Processing – I think it best to process the matrix and catalogue to derive some suggested best practice description in the various areas and then by means of focus groups arrive at agreement on what can be called best practice and hence construct an outcome of a best practice portfolio in electronic communication and this can be used by individuals and training management to help ensure the target of communication being viable, efficient and satisfying to participants.

Explain – this is about saying why something is. So one can describe an event but also explain why it occurred
Problem – serious concerns in some departments over impacts on working practices of a proposed new land registry application
Example – My BAGeD is to explain possible impact effects of a new land registry application system and database in common areas such as: cost, performance, user acceptance, etc
Research Method – the suggested method here is an extended survey as the system itself is quite extensive
Collection Protocol – there will be three main mechanism: document searching to establish expected benefits and then observations and focus groups to establish the consequences in the various areas
Pre-Processing – the observations and focus group information will be compiled under various headings using a standardised format and catalogued but will in large part be based on the companies stress model as the main aim here is to assess impacts but largely those will be people based impacts. The chosen method is to draw one or more Rich Pictures based on the catalogued information so that various perceptions can be shared and as a final step carry out another focus group where the pictures are examined and discussed.
Outcome Processing – the intended outcome will be generated based on a careful analysis of the catalogue produced in pre-processing. From the catalogue and the final focus group information a comprehensive impact report will be compiled that can be used to assist in planning by management for the implementation of the new system and hence achieve the target of alleviating genuine personnel concerns and preparing the organisation for a smooth transition.

Explore – You can use this word but we are always exploring so it must be used with care. Typically, in these cases one starts with a model of some kind and uses that to inform the exploration process. For example, we might have a theoretical process map and we use it to explore various working processes to see if we can find flaws or weaknesses and then those descriptions of flaws or weaknesses become our primary data
Problem – loss of market potential for my company
Example – My BAGeD is to explore the company business profile with regard to its fit within the modern global economy and the use of the Internet and eMarketing/eCommerce
Research Method – this is exploratory and in this case it seem best to think of the whole company as one case study area and the need to clearly understand its business profile.
Collection Protocol – there is potentially a lot of information here and it might be in diverse places including just in people minds so it seems best to use interviewing coupled with document searching and then follow this up by seminar sessions to share perceptions via Rich Pictures.
Pre-Processing – The various interview transcripts and document extracts will be examined using normal text processing ideas to produce a detailed company business description (products, policies, structure, finance, Issues, IT infrastructure, etc) supplemented by feedback from the seminar sessions.
Outcome Processing – armed with the full business description and Rich Pictures there will be an open discussion with consultants about creating an outcome of a business case for an eMarketing/eCommerce outlet with the target of increasing the company's market potential based on using Porters 5 forces model as a starting point.

Illustrate – Here one is trying to find a way to expresses in a very pointed way some situation or thing. So one might identify an instance of SPAM and then illustrate why it might be harmful so adding poignancy to the example you have extracted. Mostly, it is best to think of illustration as a way of giving an example but in that example you want to make just one clear point
Problem – expressed dissatisfaction with the quality of delivery within a training organisation
Example – My BAGeD is to illustrate how a student's acceptance and satisfaction in a training course are affected by the various technologies that might be used.
Research Method – this is a new area and I am not sure what sort of things will emerges so it is therefore largely an exploratory study and since I am aiming to find various factors that might be significant I think the Vignettes method is the most appropriate.
Collection Protocol – in this case I am looking for examples or illustrations of the various factors in action. It therefore seems appropriate to use both interview and observations of participation activities that occur during training.
Pre-Processing – the raw primary data will be in the form of simple illustrations of training activities and an assessments of the technology effects that were observed. This raw data will be processed to find a common catalogue of illustrations that explain technology acceptance and satisfaction levels and each illustration will effectively define a training factor.
Outcome Processing – using the catalogue of illustration and named factors a training model will be constructed that maximises both satisfaction and acceptance. This will be accomplished by using the standard model features and outline course learning objectives. The outcome will be used by trainers to re-model all course offerings and hence achieve the target of higher satisfaction levels in our course provision.

Interpret - The essence here is that one is typically observing something to describe it but also to find some meaning in what is being done. This is often used when looking at social groups or situations where it is not always obvious why certain actions occur
Problem – getting more value out of POS systems
Example – My BAGeD spotlight will be interpreting customer responses to kiosk/POS implementations.
Research Method – given the large number of potential sample points here it seem obvious that a survey is the only feasible choice
Collection Protocol – the protocol will be a survey of customers by means of interviews to obtain data such as average age of buyer, degree of satisfaction, service speed etc. To balance this I will also obtain from the client such things as increase in perceived business value, improvements in customer relations, kiosk usage statistics etc.
Pre-Processing – the interview data will be processed using the usual text processing methods with some simple statistics and all this data will be structured into a matrix with the various factors identified during text processing – one matrix from a customer viewpoint and another from the retailer viewpoint.
Outcome Processing – once the matrices and statistics are available I will construct a report on the efficacy of this enhanced form of POS using the PESTLE (Political, Economic, Sociological, Technological, Legal and Environmental) model of analysis. This report will be useful to managers contemplating this technology as it may help in pinpointing what conditions within the market place must exist for it to be successful and hence lead to the target of getting more return on the POS systems.

Justify - Show adequate grounds for decisions and conclusions and answer the main objections likely to be made about them.
Problem – suggested productivity gains in upgrading to MS vista
Example – My BAGeD here is to attempt to justify a new function set based in expected productivity gains
Research Method – my basic aim here is to indicate (it is not possible to prove) the viability of productivity gains from an upgrade to Vista. It follows, that the essential method here is my means of Quasi-experiments because it is not feasible to install Vista on the live environment since that would imply the decision to upgrade has effectively been made. It follows that for testing to be feasible any possibly justifications must be made in a simulated environment.
Collection Protocol – the means here is simple data recording based on a series of Vista function tests. To carry out the tests a series of known common tasks will be formulated covering general topics such as searching, surfing, organisation (of directories and files), ..., and products based on covering Word, Excel and PowerPoint. The process will be to use the series of common tasks as part of a training exercise in Vista with several staff recruited to carry this out. The recorded data will be exercise timings, accuracy achieved and a reflective diary kept by each participant coupled with the participant and observed function justification (why it might be useful or more useful than that available currently)
Pre-processing – this will classify all functions tested and with various statistical calculations attached. The reflective diaries will be scanned for pertinent comments on each function. This will be structured into a catalogued report ordered by function.
Outcome processing – the catalogued justification report will be analysed from three viewpoints: the first will be utility (how well did the function perform), likeability (how well was it received by participants) and potential cost benefits in terms of productivity in order to generate a careful review and recommendation to management. This outcome can then be used to gain the target of an informed management on the expected gains/losses of the proposed upgrade.

Link - This is often a neat way of dealing with some types of data where you think there is a relation but the relation itself is not known with any certainty. One often finds this kind of activity evidences in a matrix formulation or representation.
Problem - inappropriate user behaviour in the use of their work based PC systems and networks leading to various undesirable side effect such as loss of bandwidth, virus infection, risk exposure etc.
Example - Suppose that my BAGeD was to link a security violation with a particular user behaviour - that will generate a primary data item (implicit here is that we also need a description of each violation and user behaviour).
Research Method - the basic method here is to use a survey instrument as these inappropriate user behaviours are thought to be widespread in the organisation and there is therefore a need to explain these actions.
Collection Protocol - search and extract violations descriptions from the log using a text processing tool. This is a sensitive area and one is unlikely to get good data by any direct means. However, interviews will be used to explore user behaviours in general.
Pre-processing - the violation descriptions will be examined in a seminar with experts to establish the behaviours that caused the violation. To do this a matrix of violations linked to user behaviour is formed with a violation severity rating based on violation extent: local to department, local to PC, local to a particular system, local to the intranet or global to the company. The interview transcripts will be summarised using normal document extraction methods and presented in tabular form to inform seminar participants
Outcome Processing - I need no to use the prioritised matrix to develop a security policy . Therefore I might search for an appropriate BS to guide me in the process or I might use a method called PLOT - but whatever I use it has to be such that it can be repeated by another person. The whole purpose of the process is that I can then draw up a policy that might help us achieve the target of eliminating or at least reducing these inappropriate user behaviours. The outcome will be presented to management for approval and then implemented by the IT department with appropriate training and technological means.

Outline - Give the main feature or principles of an object, omitting minor details and emphasising structure and arrangement
Problem - IT services migration time overruns
Example - My BAGeD is to outline an engineer's activity for each migration service.
Research Method - this study examines past records of migration activities and it is about understanding them and the services they support so it seems best to think of this as case study but based on historic data with a number of migrations examined.
Collection Protocol - the main protocol is document searching to extract the necessary data via online status reports and these may be supplemented by interviews with engineers and/or the service providers.
Pre-processing - Once I have collected my primary data I will structure it as a categorized table with engineer activity and migration services noting cases where migration delays occurred. The table will be organised on a key activity idea where these key activities have been established by an examination of the project plan.
Outcome processing - a migration model will be used to process the categorized table to develop an optimised strategy for project control of key migration activities and used by project managers to get the target of reducing migration project overruns.

Portray - This might be a useful verb if you were looking for types in a study. For example, if you were looking for people who get involved in illegal downloads one might want to portray them in some way.
Problem - SPAM is junk mail and leads to high loading on infrastructures but this study will focus on the increasing level of complaints from users ranging from simple irritation to exceeded mail box quota lock-outs.
Example - The BAGeD will be to portray SPAM instances by extracting messages from various server logs.
Research Method - methods of SPAM prevention are well known and for this study to be interesting it needs to uncover something new that might help in the SPAM elimination battle. One such element might be to portray various kinds of SPAM perpetrators and to this end the study will explore SPAM messages in order to discover these portraits and so it seem best to use the idea of Vignettes
Collection Protocol - since we need to look at messages there is an inherent risk that they also carry elements such as a virus of some kind which opening the message might trigger. For this reason the SPAM message data will be extracted electronically using a tool which I will build so that the data can be examined in a secure environment.
Pre-processing - messages will be examined for common structural features such as: header, topic, sender, method of reply etc - to build up profiles of a typical SPAM message types. Once the profiles are available each message will be standardised and then presented as a catalogue . Using the catalogue a second stage of pre-processing will examine each standardised message to profile each message element: header, address, body and so on and that additional information will be added to the catalogue. The principal mechanism used here in this standardising process is the usual text processing ideas of looking for key words, labels and so on.
Outcome processing - using the SPAM message catalogue and element profiles the Cambridge profile model will be used to portray senders: introduction, personal needs, interests, skills, comparison with other similar profiles, message and profile match, conflicting indicators and message offering. These portrayals will be placed in a catalogue of SPAM perpetrators with commentary and used to get the target of informed users and also used by system managers as a guide to building SPAM secure systems.

Profile - This is similar to a description but it focuses on just the key points. For example, if we were looking for best practice in a situation then we might start by just profiling a given task – that is we outline the main steps and rationale to start with. The idea is similar to an outline but implies deliberate selection of certain aspects.
Problem – high levels of dissatisfaction with the very low revenues achieved through College fund raising activities
Example – My BAGeD will be to profile donors' giving habit/pattern/background and their associated publicity strategies.
Research Method – in this case there are a large number of donors and the whole purpose here is to try explore what it is that drives them in their giving. It therefore seems sensible to use Vignettes as the most useful research model to use here because good and bad examples will aid in the exploration process.
Collection Protocol - Semi-structured interviews will be an effective vehicle to collect this data as it is of a sensitive nature. Preparation for these interviews will be by means on an analysis of donation records together with an examination of past publicity strategies .
Pre-processing – the interview transcripts will be pre-processed using the usual text processing ideas such as: labels, common themes, outliers, etc and from this the various illustrations will be constructed and formed into a PowerPoint Presentation
Outcome processing - the PowerPoint presentation will be used in a conference for senior managers to review/assess the fund raising illustrations. The conference will be split into groups, each group presenting its review findings at the close of the day and from this a position paper outlining a new strategic options generation framework with recommendations for an associated IT infrastructure will be generated. The process used to generate the framework will be a simple input/output model with the usual elements of performance, procedures, inputs/outputs, facilities and equipment and finally required skills and knowledge. The options framework can be used to derive IT supported fund raising initiatives the target of increased and assured College funding.

Represent - Sometimes you might plan to build a representation of some event as you primary data. For instance, if one was looking for security awareness in employees then of course one cannot "see" it or collect it as such. In these cases we must try to find a way of representing an awareness level or feeling and that representation forms our data.
Problem - management uncertainties and confidence regarding the proposed implementation of an EDM system.
Example – My BAGeD will be to try to represent the way information is managed currently being conscious that it may exist, be stored in, captured/archived and accessed in many forms including paper, microfilm, microfiche, tapes and CD.
Research Method – I need to get a close understanding of the document management issues and it seems therefore best to use case study approach here where I will think of each case as typified by an information medium. The study here will be by means of a light touch as I am not trying to gather requirement but only a representation of practices.
Collection Protocol – I anticipate that most of the document management practices are not available in written form consistently anywhere and I see no alternative but to use an observation and interview protocol in order to elicit the representations I need.
Pre-processing – using the observation and linked interview transcripts I will construct a catalogue of standardised representations of document management practices. The process itself will be to use the idea of best practice to form each standardised representation using: definition, control structures, design, distribution, accessibility, security classification, content type, associated policy/rules, status (contractual, regulatory etc) and issuing authority.
Outcome processing – I will use a type of spin-off model to asses probable impacts from which uncertainties may be gauged and hence confidence increased. I particular a modified form of the HAL Technology Impact Model with 4 elements: sponsoring agency, contractual, users, and other linked technology products. Using this simple model I should be able to use the catalogue of representations to asses what activities will need sponsorship, what activities will be spin-offs and where activities may be defused or unclear. Bases on the above assessment a report will be prepared to ensure the target of an informed and aware management board regarding the possible impacts in order that any new technology can be implemented with minimum disruption.

Summarise - Give a concise and lucid explanation or account of something, presenting the chief factors and omitting minor details and examples
Problem - over exposure of the corporation's data assets which may lead to data theft and increase reputation loss risk.
Example - My BAGeD is to summarise the corporation's data assets by defining their value, criticality, sensitivity and legal implications.
Research Method - Survey – this research will solicit information on the data asset types, risk ratings and legal implications from the data owners and legal department so the use of surveys will facilitate the timely and standardized collection of this data.
Collection Protocol - Document Searching of recently completed Risk Reports for data value coupled with the use of interview scripts to define data, its criticality and sensitivity and to determine legal implications.
Pre-processing – The primary data will be scanned to complete a grid showing data types by sensitivity, legal requirements, reputation and other risk
Outcome processing - The data classification grid will be used to determine access permissions appropriate to a particular information asset based on an asset owner's assessment and be the basis for a data classification guideline for the Corporation's data assets protocol . The protocol will be used in corporate governance to gain the target of assured information assets.

Synthesise - Resolve something into a whole from its component part.
Problem – there is a concern that provision of IT services is not aligned with strategic organisational goals.
Example – My BAGEd is to synthesise the various aspects of IT service delivery by examining delivered services to see what practices are involved.
Research Method – in this case I need to gain a thorough understanding of service delivery but at this stage I regard it as relatively unknown and exploration is needed and so it seems best to use the Vignette method to look for delivery exemplars or their opposite.
Collection Protocol – essentially this is about business performance issues and how performance is assured in part at least by IT service. With this backdrop in mind I will use interviewing to trace various IT services and their outworking and effects in business units. For this to be successful it will be necessary to obtain a list and description from the IT department beforehand of the various IT services commonly used in the organisation that might be regarded as business critical.
Pre-processing – based on interview transcripts I will extract perceived uses and needs and match this to the service definitions provide by the IT department. The collection of data will be expressed in matrix form and prioritised by a consideration of its essentiality to business but each entry will be a service delivery exemplar (positive or negative).
Outcome processing – using the list of exemplars I will use the ITIL service delivery model and a goal alignment model to recommend changes to the current practices so that IT service delivery matches needs so that IT managers can use it to get to the target of IT service goals being more strongly aligned with business goals.

Exercise 002a.01q – Finding a Useful Outcome and Knowing what it is as a Structure

Outcomes are objects of some kinds and they allow you to add structure to the way you present your project overall findings. However, for this to make sense you have to know what these structures are and how they might be constructed – they all have an underlying model and that is what you need to know in order to use them - unless you know and understand these models you are wasting your time listing any of these structures as an outcome.

For example, suppose you say you outcome is a “strategy” then it will only make any sense if you know what a strategy is and have a model to use in its construction. It is simply foolishness to assume you know what these things are and if you write them down without a clear understanding you are going to get into serious trouble in your project.

In the table that follows I list a large number of possibilities and you may be able to add others. Not all of the things listed may be useful in technology related projects but it is useful to be aware of the wide range of possibilities.

Exercise 1 - Write some notes on at least 5 of the following structures, choosing at least two that you have no little knowledge of, to explain to fellow students what the following outcomes are in practice and how thy might be used.

An Account of	
Appendix	
Argument	
Article	
Best Practice Description	
Calendar	
Cartoon	
Catalogue	
Chart	
Collation	
Colophon	

Concordance	
Confession	
Critical Apparatus	
Diagram	
Dictionaries	
Dossier	
Emendations	
Essay	
Framework	
Grammar	
Guidelines	
History	
Index	
Instructions	
Lectionary	
Lexicon	
List	

Map	
Matrix/Table	
Menu	
Method	
Methodology	
Model	
Orders	
Pamphlet	
Plan	
Policy	
Position paper	
Preface	
Principles	
Procedure description	
Process Description	
Prospectus	
Protocol	

Recension	
Report	
Research Papers	
Review	
Schedule	
Set of Rules	
Strategy	
Testimony	
Theory	

unknown Data for the company.

ACE Lecture: Classification and data mining for SBIT

- Databases store information such that all features and attributes are considered of equal weight.
- For data mining purposes, however, we need to focus on relevant and/or causal attributes only
- The *identification tree* approach, as described by Quinlan (2002) and Winston (1992), identifies which subset of features from the feature set are the most important for classification.
- We need a *disorder formula* and associated log values to rank attributes in terms of their influence on classification

Example dataset

Name	Hair	Height	Weight	Lotion	Result
Sarah	blonde	average	light	no	sunburned
Dana	blonde	tall	average	yes	not sunburned
Alex	brown	short	average	yes	not sunburned
Annie	blonde	short	average	no	sunburned
Emily	red	average	heavy	no	sunburned
Pete	brown	tall	heavy	no	not sunburned
John	brown	average	average	no	not sunburned
Katie	blonde	short	light	yes	not sunburned

Table 1: Table of data describing who is and who is not sunburned, with attribute values (adapted from Winston, 1992).

The task now is to determine which of the attributes contribute towards someone being sunburned or not. (Adapted from Winston, 1992)

	Hair	Height	Weight	Lotion
blond				
average				
light				
tall				
short				

Logarithms

- In mathematics, a **logarithm** of a number x in base b is a number n such that $x = b^n$, where the value b must not be 0. It is usually written as $\log_b(x) = n$
- The interpretation is: " b to what power (n) equals x ?"
- For example, since $2^4 = 2 \times 2 \times 2 \times 2 = 16$, $\log_2(16) = 4$

Disorder, or information gain, formula

$$\text{Average disorder} = \sum_b \left(\frac{n_b}{n} \right) \times \left(\sum_c - \frac{n_{bc}}{n_b} \log_2 \frac{n_{bc}}{n_b} \right)$$

where n_b is the number of samples in branch b , n_c is the total number of samples in all branches, and n_{bc} is the total of samples in branch b of class c .

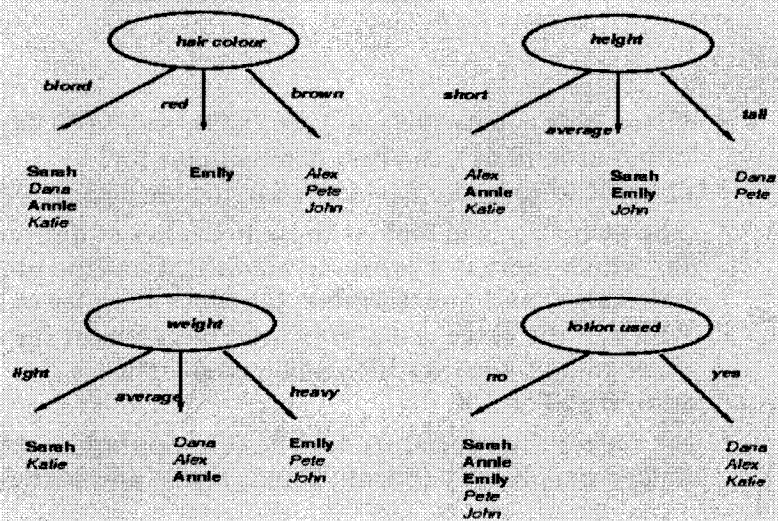
- Divide samples into subsets that as homogeneous as possible
- The higher the disorder value, the less homogeneous the classification.
- Work through each attribute in turn for first iteration

Log values

$-\log_2 = 0.375$
 $-\log_2 = 0.5$
 $-\log_2 = 0.531$
 $-\log_2 = 0.5$
 $-\log_2 = 0.424$
 $-\log_2 = 0.311$
 $-\log_2 = 0.169$
 $-\log_2 = 0$
 $-\log_2 = 0.528$
 $-\log_2 = 0.39$
 $-\log_2 = 0.464$
 $-\log_2 = 0.529$
 $-\log_2 = 0.442$
 $-\log_2 = 0.258$

• In Franz Lisp:
 (defun log2 (xy) (* (/ xy) (/ (log (/ xy)) (log 2))))
 i.e. $n \log_2 n = n (\log_{10} n / \log_{10} 2)$

First iteration



Names in bold indicate who is sunburned

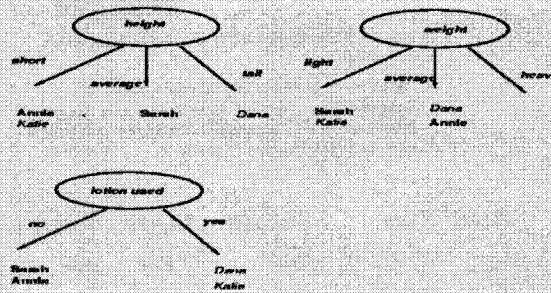
- Given hair colour (0.5), height (0.69), weight (0.94) and lotion used (0.61), the best determinant for classification in the first iteration is hair colour (0.5).
- The next step is to look at those branches of hair colour for which there is a confused classification (the blond hair value) and to determine, for those samples only, which of the three remaining attributes is best for determining whether blond-haired people are sunburned or not.
- So, repeat the procedure for the subpopulation of blond haired people only (Sarah, Dana, Annie and Katie)

Results of first iteration

- Lotion used: $\frac{8}{5} \left(\frac{5}{3} \log_2 \frac{5}{2} - \frac{5}{2} \log_2 \frac{2}{3} \right) + \frac{8}{3} \left(\frac{0}{3} \log_2 \frac{0}{3} - \frac{0}{3} \log_2 \frac{2}{3} \right) = \frac{8}{5} (0.442 + 0.529) + 0 = 0.61$
- Weight: $\frac{8}{2} \left(\frac{1}{2} \log_2 \frac{1}{2} - \frac{1}{2} \log_2 \frac{2}{2} \right) + \frac{8}{3} \left(\frac{1}{3} \log_2 \frac{1}{3} - \frac{1}{2} \log_2 \frac{2}{3} \right) + \frac{8}{3} \left(\frac{1}{3} \log_2 \frac{1}{3} - \frac{1}{2} \log_2 \frac{2}{3} \right) = \frac{8}{2} (0.5 + 0.5) + \frac{8}{3} (0.528 + 0.39) + \frac{8}{3} (0.528 + 0.39) = 0.94$
- Height: $\frac{8}{3} \left(\frac{1}{3} \log_2 \frac{1}{3} - \frac{1}{2} \log_2 \frac{2}{3} \right) + \frac{8}{3} \left(\frac{1}{3} \log_2 \frac{1}{3} - \frac{1}{2} \log_2 \frac{2}{3} \right) + \frac{8}{3} \left(\frac{1}{3} \log_2 \frac{1}{3} - \frac{1}{2} \log_2 \frac{2}{3} \right) = \frac{8}{3} (0.528 + 0.39) + \frac{8}{3} (0.39 + 0.528) + 0 = 0.69$
- Hair colour: $\frac{8}{4} \left(\frac{4}{2} \log_2 \frac{4}{2} - \frac{4}{2} \log_2 \frac{2}{2} \right) + \frac{8}{1} \left(\frac{1}{1} \log_2 \frac{1}{1} - \frac{1}{0} \log_2 \frac{1}{0} \right) + \frac{8}{3} \left(\frac{1}{3} \log_2 \frac{1}{3} - \frac{1}{0} \log_2 \frac{2}{3} \right) = 0.5$
- That is, $\frac{8}{4} (0.5 + 0.5) + \frac{8}{1} (0 + 0) + \frac{8}{3} (0 + 0) = 0.5$

Disorder values for first iteration

Second iteration



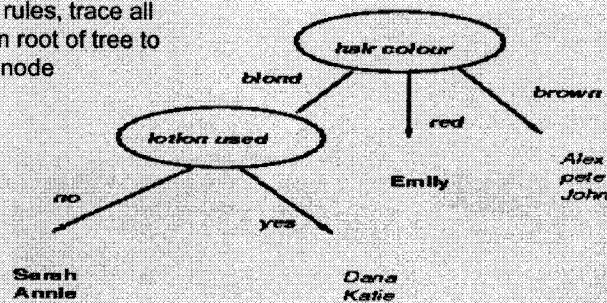
Height: $\frac{2}{4} \left(-\frac{1}{2} \log_2 \frac{1}{2} - \frac{1}{2} \log_2 \frac{1}{2} \right) + \frac{1}{4} \left(-\frac{1}{2} \log_2 \frac{1}{2} - \frac{0}{2} \log_2 \frac{0}{2} \right) + \frac{1}{4} \left(-\frac{0}{2} \log_2 \frac{0}{2} - \frac{1}{2} \log_2 \frac{1}{2} \right) = 0.5$

Weight: $\frac{2}{4} \left(-\frac{1}{2} \log_2 \frac{1}{2} - \frac{1}{2} \log_2 \frac{1}{2} \right) + \frac{2}{4} \left(-\frac{1}{2} \log_2 \frac{1}{2} - \frac{1}{2} \log_2 \frac{1}{2} \right) + \frac{0}{4} \left(-\frac{0}{2} \log_2 \frac{0}{2} - \frac{0}{2} \log_2 \frac{0}{2} \right) = 1.0$

Lotion used: $\frac{2}{4} \left(-\frac{2}{2} \log_2 \frac{2}{2} - \frac{0}{2} \log_2 \frac{0}{2} \right) + \frac{2}{4} \left(-\frac{0}{2} \log_2 \frac{0}{2} - \frac{2}{2} \log_2 \frac{2}{2} \right) = 0$

Full identification tree and derived rules

To derive rules, trace all paths from root of tree to each leaf node



- If a person's hair colour is brown, then the person is not sunburned.
- If a person's hair colour is red, then the person is sunburned.
- If a person's hair colour is blond and that person has used sun tan lotion, then the person is not sunburned.
- If a person's hair colour is blond and that person has not used sun tan lotion, then the person is sunburned.

Exercise

Imagine that you are a management consultant brought in by a factory to help identify why it is that certain production runs result in low output and to recommend actions.

Examine the following table which gives the history of eight production runs in a factory setting.

Run	Supervisor	Overtime	Operator	Output
1	Sally	yes	Joe	high
2	John	no	Samantha	high
3	Sally	yes	Joe	high
4	John	no	Joe	low
5	Sally	yes	Samantha	high
6	Patrick	no	Samantha	low
7	Sally	yes	Joe	high
8	Patrick	no	Samantha	low

Construct a complete identification tree using this information and identify the factors which determine high and low output. You may need to use a calculator also.

Learning methods

- The above process underlies the best known classification techniques in symbolic machine learning: ID3, C4.5 and See5/C5.0 (Quinlan, 2002).
- Variant: split the samples into two sets: the training set, and the test set.
- The training set is first used to extract identification trees and rules from the samples in that set.
- Then the test set, which consists of samples not previously seen by the machine learning system, is input to the extracted trees and rules to see whether the samples are correctly classified
- Typically, 10% of all samples are removed to form a test set, and the remainder used for training.

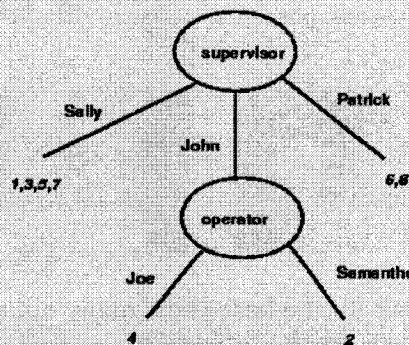
Problems with symbolic classification

- 'Overfitting': the system converges on a set of rules or identification trees that are highly accurate in classifying samples in the training set but perform much worse when presented with samples in the test set.
- 'Cross-validation' is sometimes used, where a number of runs of the machine learning system are made on all samples, with each run choosing a random 10% of samples to generate a test set.
- Different sets of rules after each run, since the rules found are based on a different 90% of samples for each run.
- Later test cases can be classified using not just the rules extracted from the training cases in that run but from all the previous rule sets from earlier runs.
- A form of 'voting' takes place between the different rule sets, so that test cases are predicted to fall into a class depending on a majority vote between different rule sets.

References

1. See http://dms.irb.hr/tutorial/tut_dtrees.php for a good tutorial on identification/decision trees
2. Craig Kirkwood, 'Decision tree primer', 2002.
Available from
[http://www.public.asu.edu/~kirkwood/DASstuff/decisiontrees/Sees \(demonstration copy\) can be downloaded from](http://www.public.asu.edu/~kirkwood/DASstuff/decisiontrees/Sees%20(demonstration%20copy).htm)
3. <http://www.rulequest.com>, together with manuals.

Solution to exercise



First iteration:
Supervisor: 0.25
Overtime: 0.406
Operator: 0.906

Second iteration:
Overtime: 1
Operator: 0

**Classification
and data mining with testing (continued)**

Client	District	House Type	Income	Previous Customer	Outcome
1	Suburban	Detached	High	No	Nothing
2	Suburban	Detached	High	Yes	Nothing
3	Rural	Detached	High	No	Responded
4	Urban	Semi-detached	High	No	Responded
5	Urban	Semi-detached	Low	No	Responded
6	Urban	Semi-detached	Low	Yes	Nothing
7	Rural	Semi-detached	Low	Yes	Responded
8	Suburban	Terrace	High	No	Nothing
9	Suburban	Semi-detached	Low	No	Responded
10	Urban	Terrace	Low	No	Responded
11	Suburban	Terrace	Low	Yes	Responded
12	Rural	Terrace	High	Yes	Responded
13	Rural	Detached	Low	No	Responded
14	Urban	Terrace	High	Yes	Nothing

Imagine we have an estate agent's database regarding brochures sent to people living in certain types of houses and areas, together with some personal information and whether there have been responses. You are engaged as a business consultant to identify the factors that determine whether someone responds to the promotional material. What do you do?

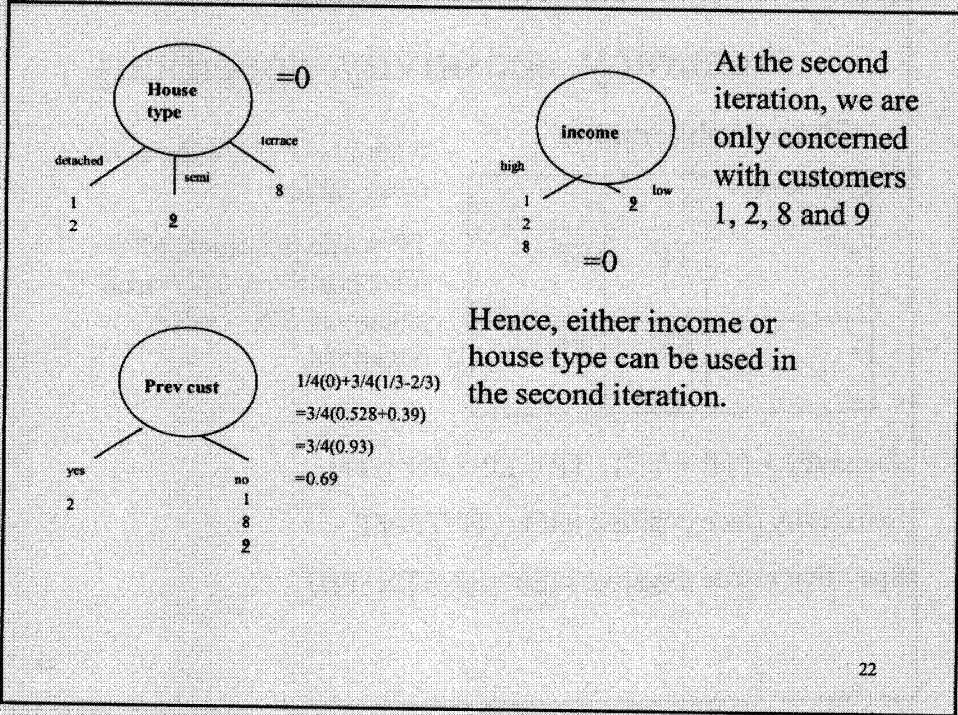
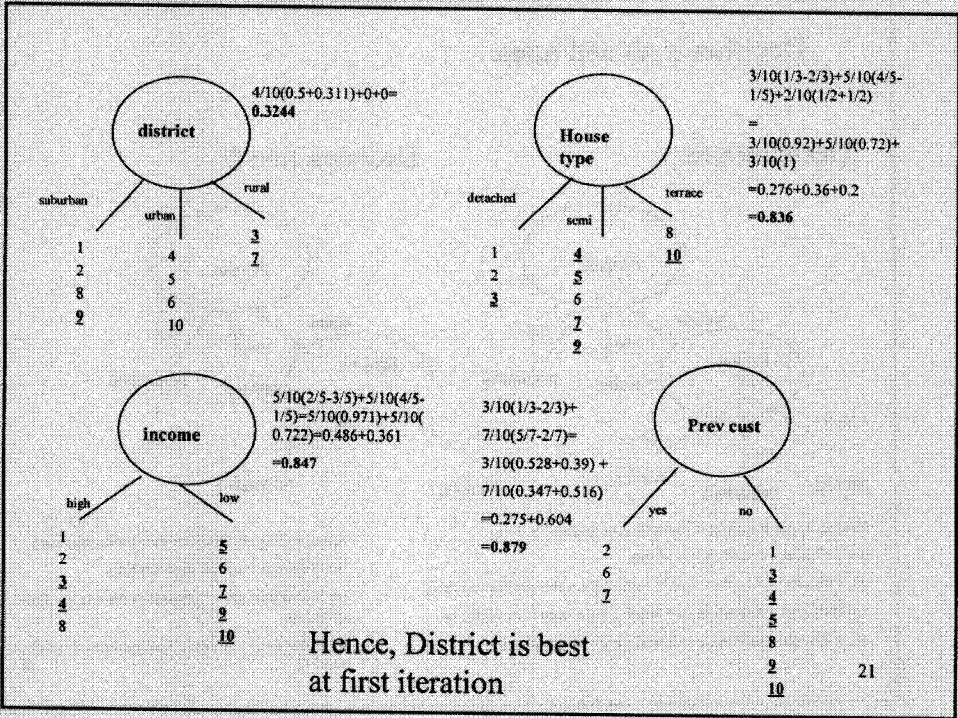
1	1log2	0	1/2	-0.500	1/3	-0.528	1/4	-0.500	1/5	-0.464	5log2
2	2log2				2/3	-0.390	1/2	-0.500	3/5	-0.442	4log2
3	3log2						3/4	-0.311	4/5	-0.258	

6	6log2	1/6	-0.431	1/7	-0.401	1/8	-0.375	0.111	-0.352	1/10	-0.332	10log2
5/6	-0.219	2/7	-0.516	3/8	-0.531	0.222	-0.482	3/10	-0.521			
		3/7	-0.524	5/8	-0.424	0.444	-0.520	7/10	-0.360			
		4/7	-0.461	7/8	-0.169	0.556	-0.471	9/10	-0.137			
		5/7	-0.347			0.778	-0.282					
		6/7	-0.191			0.889	-0.151					

Log₂ tables: to find a value, look for the base (how many out of how many) column and then look for the fraction (how many out of how many) to find the log value. Note that all log values are negative, which means that you must **add** these values together when calculating an entropy measure.

Cross-validation

- Split the data set into two: a training set of 10 records and a test set of 4.
- Construct an ID tree and associated rule set using the 10 records.
- Then use the tree and rule set to test the accuracy of the tree and rule set on the 4 'unseen' cases.



Accuracy, sensitivity, specificity

Given a table/matrix:

Actual/predicted	+	-
+	TP	FP
-	FN	TN

where '+', '-' are the two class values;

TP = true positives; FP = false positives; TN = true negatives; FN = false negatives

$$\text{Accuracy} = (TP + TN) / TP + FP + FN + TN$$

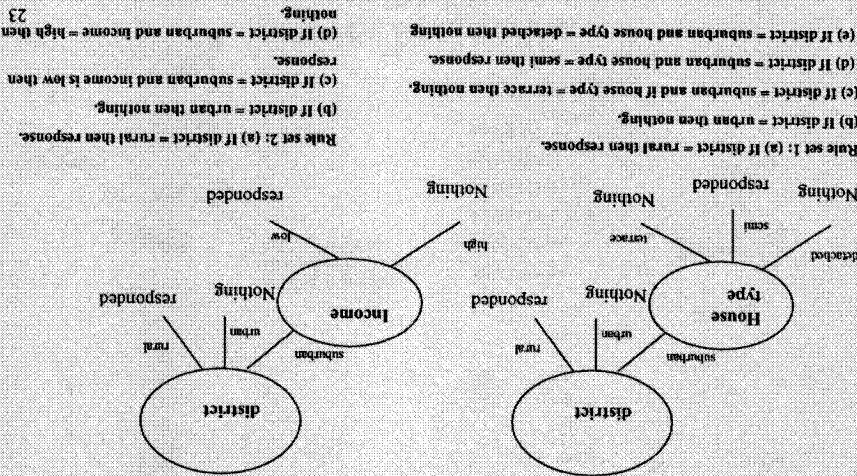
$$\text{Sensitivity (true positive rate)} = TP / TP + FP$$

$$\text{Specificity (true negative rate)} = TN / (TN + FN)$$

Decision trees and rules:

Decision tree 1:

Decision tree 2:



Cross validation

Rule set 1:

- (a) If district = rural then response.
- (b) If district = urban then nothing.
- (c) If district = suburban and if house type = terrace then nothing.
- (d) If district = suburban and house type = semi then response.
- (e) If district = suburban and house type = detached then nothing

- 11 Suburban Terrace Low Yes Responded
- 12 Rural Terrace High Yes Responded
- 13 Rural Detached Low No Responded
- 14 Urban Terrace High Yes Nothing

Actual/ predicted	+ (responded)	- (nothing)
+ (responded)	2	1
- (nothing)	0	1

Accuracy= 3/4 = 75%; sensitivity= 2/3 = 66%;
specificity= 100%

Rule set 2:

- (a) If district = rural then response.
- (b) If district = urban then nothing.
- (c) If district = suburban and income is low then response.
- (d) If district = suburban and income = high then nothing.

- 11 Suburban Terrace Low Yes Responded
- 12 Rural Terrace High Yes Responded
- 13 Rural Detached Low No Responded
- 14 Urban Terrace High Yes Nothing

Actual/ predicted	+ (responded)	- (nothing)
+ (responded)	2	0
- (nothing)	0	2

Accuracy=100%; sensitivity= 100%; specificity= 100%

Conclusion

- You should recommend a marketing strategy based on district of potential clients and their income if you want to maximise responses to mailshots.
- You will be able to cite information perhaps not previously known to the estate agent company and give that company a competitive edge over rivals

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Student Workbook Pack

Research Methods for Master's Students

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1. WORKBOOK 1. MASTER'S PROGRAMME OUTLINE

The Master's programme has two units of study: Research Methods and Project and the online programme notes together with this workbook pack cover all the information you need to complete it.

1.1 University Expectation

The University expects that when students submit work it is the very best they can do. In practice this will mean several things and all of them will be examined when work is assessed.

English – written English must be of a Master's standard and that means an IELTS score of at least 6.6 (or equivalent) is needed. If submitted written work is judged to be below this standard, students will NOT be allowed to progress to the project stage no matter what their actual language certification states.

Structure – work must be well structured and coherent. In practice students will most often work with a pre-defined set of headings and they must be used explicitly without deviation in their implied content.

Preparation – good work can only be produced if there has been adequate preparation. This will mean a thorough study of any and all references and exercises. Study does not mean a quick read through the notes or academic arrogance which says "I don't need it" or "I know all this stuff". This preparation also means working through the topic idea for your project itself so that one becomes expert in a particular field.

Instructions and Guidance – all the work you submit will have to meet various standards in terms of layout and format and students are expected to follow such guidance diligently.

Using other people work – all work submitted must be the student's own but within that work they may refer to the work of others but all material used must have proper attribution. Thus, if another author's work is copied, paraphrased or summarised it must be properly cited. Students need to understand that paraphrasing (putting things in your own words) and summarisation will amount to plagiarism if not properly attributed. This is a very serious matter and the rule with regard to copying is very simple. If 6 or more words are copied then the sources must be cited and if 10 or more words are copied without attribution then that is regarded as proof of plagiarism

Student's Own Work – the submitted work must be entirely constructed by the student and to do this it is necessary to weave into one's own ideas and thoughts the work of others. One may use the work of others to lend support to a proposition, or to include a definition or an explanation and so on. In other words it is not so much a question of how much of another person's publication one uses but what one does with it in constructing one's own research work. In short scholarship is acknowledging and using the work of others whereas plagiarism is using the work of others and in so doing attempting to fool the reader into thinking it is one's own.

Respect – when writing one is doing it for another person to read and it's therefore a grave sin in those circumstances not to offer the very best one can produce.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying and it is not just common knowledge or obvious. The key task is to formulate one's own ideas, in one's own words by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

1.2 Overview of Unit Assessment

The two units: Research Methods and Project are assessed separately and students must in each one gain at least a pass grade in order to qualify for a Master's award. The assessment artefacts are.

Research Methods Unit (15 Credits)

The Research Methods Unit will be taught over approximately 12 weeks and assessment details will be published to you early in the Unit. The assessments will be to provide project specification plus a short literature review

Project Unit (45 Credits)

The Project is an extended research exercise where students will be guided by a personal supervisor. For students who have passed assessment 1a, approved projects will start a few weeks after the end of the Research Methods Unit and last for at least 18 weeks. There is only one assessment and that is to prepare a project document based on the specification developed in Research Methods Assessment and is required in the Project itself can be found in Workbook 9.

1.3 Research Methods Unit Assessment Overview

This unit of study requires about 150 hours of effort from each student and will cover research principles, research ideas, research techniques as well as statistics. Assessment details and due dates will be made available early in the study period for the Unit in WebCT. It is essentially in two parts as follows.

Project Proposal Approval – when the Research Methods unit begins students need to gain approval for a project title/idea. The university will supply a list of ideas or students may bring one of their own as long as the related project outcome has a strategic business IT dimension, it is new work, it involved learning in IT and it is a Master's level activity. In the approval process students have to write a short submission to a set format and send it in a plain email to the Research Methods tutor whose decision is final.

Approved – the submission, whilst not necessarily being perfect, meets all the above project criteria and the outline is judged good enough for the student to begin work on the specification. About two weeks after approval is granted a supervisor will be allocated who may assist you in finalising the project Specification.

Permitted – the submission has a suitable idea but its construction is judged to be of poor quality but the student is given the benefit of the doubt and is expected to make good in the specification. No supervisor will be allocated and final approval will be depended on the quality of the final specification.

Rejected – the work is received after the due date or submission does not meet the criteria for a project in this degree and a new topic must be chosen and a new application made. Most often this is because there is no Strategic Business IT, the project research is regarded as trivial or plagiarism is detected.

Short Literature Review and Specification Approval – based on an approved or permitted project proposal students prepare a short literature review and full project specification which must be posted into a WebCT drop box on or before the assessment due date. The Research Methods tutor will review the work and write a feedback report for each student. The specification and feedback report will then be placed before a University panel who will decide whether it is appropriate for a Master's level project. At the end of the specification approval process one of four outcomes is possible:

Pass and Specification Approved – students who obtain a Research Methods pass will be allocated a project supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Approval will not mean that a specification is perfect and it is expected that students will take note of any feedback given by the Research Methods tutor or the allocated supervisor to further refine it.

Pass and Specification Conditional Approval - students who obtain a Research Methods pass will be allocated a project supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Conditional Approval means that there are some significant concerns that must be addressed before work begins and students are expected to redraft their specification, based on feedback given by the Research Methods and in discussions with the allocated supervisor.

Fail and New Topic – this means that a student specification has been rejected in its entirety and another topic must be chosen and work must begin again by seeking approval for the new topic before writing a new specification for submission in the next available cohort. This action is most often used when the University decides that the work is trivial, or the work has no significant IT content, or the student has submitted a specification without gaining approval for the topic, or plagiarism is identified.

Plagiarism is Identified – no result will be confirmed and no approval is given and the relevant student work is subject to review by a disciplinary panel. Plagiarism is a form of deliberate deception in order to gain advantage and will always be treated with the utmost seriousness and may even result in students being dismissed from the course.

1.4 Assessment - Master's Project

This unit of study requires about 450 hours of effort, guided by a University appointed supervisor and based on the specification developed earlier in the programme. The actual project document must be supplied in the form shown in section 9 of these notes and is expected to be of about 15,000 words maximum (excluding appendices).

Once allocated a supervisor, students will be asked on what date they wish to submit their project. The only rule regarding project activity is that it must last at least 18 weeks and no more than 1 year but it will be a matter for students to negotiate with their supervisor and the University to agree a submission date. Students are allowed to make small changes to the specification during the project process but they must be approved by the supervisor and must not amount to a change of the topic that was approved.

2. WORKBOOK 2. RESEARCH METHODS CHAT AND STUDY PLANS

This is a general plan for study where chat sessions are important because they are collective and interactive and typically focus on just one important feature of research and to get the best out of the course students need to prepare for them properly: reading the notes, studying the samples and exercises and multi-choice tests that go with each notes chapter, the Workbooks and contributing if you can to the discussion boards.

2.1 Contact Mechanism

Contact with students is through email, discussion boards or chat. Email is very important and you should ensure that you use an Internet based service so that you can get mail almost anywhere. It is not recommended that you use a work-based email account as these are often tied to a location and in any case its not regarded as professional to get course email mixed up with you work ones.

It is good practice to create an email account just for the duration of the course and a common choice is GoogleMail because the storage space is, for all practical purposes, unlimited. If you are not able to create a GoogleMail account let me know and I will send an invitation to you. It is important that only ONE email account is used for communication and that address is made know to the Research Methods tutor as follows.

Whatever, mail system you use it is advisable to set mail forwarding from both your WebCt accounts to your personal one to ensure that you get mail as soon as it available. It is also useful if students have a Skype or IM account as many tutors allow direct access if they are online. Skype is preferred since chat, voice and video are all catered for and during contact one does not get bombarded with advertising. Internet email services vary considerably but my recommendation is that you only use a service that:

- Provides a virtually unlimited storage capacity
- Guaranteed to work from almost any location: hotels, airport, etc
- Allows you to set a mail forwarding address (most services do not so check this with care)
- Provide quality SPAM filtering, virus checking and is not on the SPEWS blacklist
- Has an https:// internet address starter (also shown with a yellow lock at the bottom of the screen)
- Allows POP redirection (so you can use Outlook and send from databases etc)

2.2 Complete Study Plan

Students must work in a committed way for the 12 weeks during the Research Methods unit and submit the work required on the set dates – there will be no extensions given other than for sickness or other indisposition (in which case students need to complete an ECF and provide documentary evidence of incapacity). Failure to deliver on time without permission will mean that the student unit result will be recorded as a fail. For the whole course the timings in hours are approximately as in the following tables:

Course Element	Time	Comments
Chat Sessions	25	Including preparation and summarizing the chat log
Regular Visit to Site	25	For email and discussion board
Study Notes/Text Book	35	Including making notes and doing the tests
Preparing Submissions	65	Including reading the relevant workbooks and topic details

Table 1. Overall Research Methods Unit Study Plan

2.3 Recommended Timings for Completing the Research Methods Work

Look at the following list of times for preparation and plan a way through this unit using these estimates.

Course Element	Time	Comments
Literature Searching	10	The key to a successful submission of the assessments is that ones mind is fully prepared with all the knowledge needed.
Proposal	10	Here students prepare a project proposal: presenting problem, target, outcome, actors and Research Question. The format used for this can be found in the Assessment description
Research Plan	10	Here students prepare a plan for collecting primary data. This is not literature searching, it is new and original research
Short Literature Review and Project Specification	35	A partial short literature review and comment is provided in Workbook 4. The Project Specification format is presented in Workbook 3.

Table 2. Coursework Submission Plan

2.4 Recommended Five Week Development Plan

In this course students must write a project proposal as soon as possible using the format set out in the Assessment papers. However, the basic project idea must be developed and refined carefully and typically it will be done in the sequence shown below where items in blue are specific to Engineering and items in red specific to study projects. Typically this refining process starts in week 3 of the course

There is NO short cut in this work and the standards are very high. The expectation is that you will read and study the notes, examples and exercises with dedication and care. Failure to study with care is usually obvious in the quality of the work presented, so work hard and think through carefully all the steps below – there is NO substitute for thinking your own idea through. There are plenty of examples to guide you but these examples are not templates they are there to help you gain understanding and not as some sort of quick fix to the work.

Topic Area Research – this is about thoroughly understanding the topic area in which your problem is set. For example, if one was looking at Inventory Management using IT in a fast moving retail environment that is where your literature research efforts are to be directed. So one would look at inventory management itself, warehouse based systems, shop shelf systems, POS systems, tracking fast moving but small value items, restocking, forecasting, re-ordering and so on. The idea is that you take time to think of all the aspects of the topic and then you try to become knowledgeable in them. There is no short cut here and the work must be done thoroughly and with commitment.

Presenting Problem Definition – every project will be based on a real-world problem of some kind. Students must define the problem as accurately as possible but the intention is to have just ONE problem definition. (See Workbook 6 section 6.2 and 6.11)

Target – this is what real-world effects will be observable if the problem can be solved. For example, the problem might be about accuracy in inventory records and that would imply that if we can find a suitable project outcome, such as a training plan, that can be used to alleviate that situation then it will result in the target of for example reduced inventory costs. (See Workbook 6 sections 6.3)

Theorizing based on the problem Theme – here one theorises about possible causes of the problem and corresponding solutions. In the case of inaccurate inventory records we might theorize solutions as being based on: production of a training plan for staff, feasibility report on possible use of technology, development of a sales policy and so on. (See Workbook 6 section 6.6)

Project Outcome Form – during theorization one chooses what might be regarded as a best solution route and this becomes the single outcome intended for a project. For example, if we take the problem mentioned above of inaccurate inventory records then a project outcome could be a feasibility report on the use of RFID as this might be seen as a way of solving/partially solving the stated problem. In Engineering projects the outcome will be an application of some kind and that needs to be described. (See Workbook 6 section 6.4 and 6.11)

Actors – once we have an acceptable outcome we must link it with a situation actors. That is we must say who (persons) will use the outcome and how they will use it to get the stated target effects. (See Workbook 6 section 6.5)

Research Question – here one tries to encapsulate the problem definition and one's outcome theorising into a concise and lucid question that will form the focus of the research effort. (See Workbook 6 section 6.8).

Research Design – this is the core of any project and it is the place where one expects to see serious and consistent thinking about how the presenting problem is to be resolved by collecting and processing primary data in order to generate the expected project outcome that will eventually lead to a real-world effect or effects called the project target. (See Workbook 3 section 3.3.6 and either 3.5.1 or 3.5.2 as appropriate)

2.5 Critical Reflection

Students must expect to go back and forth over their work because as knowledge and understanding grows one will inevitably see that some of one's earlier work was incorrect or not as clear as it could be or maybe it can be improved in some way. This revision strategy is very important as a common fault with research work is that it often lacks consistency because there was no serious reflection on earlier work.

2.6 Chat Session Profiles

The following is a simple guide as to what students will be covering in the online chat sessions. These sessions are extremely important as they are usually interactive and are based on using examples. The Research Methods Unit will involve a chat session roughly once every week – half these sessions will be based around the notion of research methods and half based on statistical processes.

2.6.1 Chat Session 1 – Setting up a Project?

The chat will focus on the idea of a presenting problem, target, outcome and actor as the basic project building blocks. From this the chat we will move to discuss a framework to surround a research project and a look at the notion of primary data and some of the core techniques that must be mastered. To prepare for this chat read Workbook 1 and 2 and Workbook 6 section 6.2 to 6.7.

2.6.2 Chat Session 2 – Refining a project Idea?

This chat will take the form of a discussion on how a project idea is explored and focused and a full example will be used followed by an open discussion and questions from students.

To prepare for this chat, students should be familiar with the title approval format shown in the Assessment papers and the specification examples and notes shown in Workbook 3 sections 3.5.1 and 3.5.2. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea. Of particular concern in this chat is the notion of presenting problem Workbook 6 section 6.2 and form of answer (project outcome) in Workbook 6 section 6.4 and 6.11. Students must work hard on these three ideas if they are to form an acceptable project specification.

2.6.3 Chat Session 3 – Problem Solving Method and Research Designs

In this session various problem solving idea will be explored from the most general to models that are focused on particular type of problem areas. Within these models we shall discuss the notion of what data might be needed to answer a research question and how that notion must be focused. To prepare for this chat students should be familiar with the title approval format shown in the assessment and have studied the specification example shown in Workbook 3 sections 3.5.1 or 3.5.2 as well as the associated notes in section 3.1. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea.

2.6.4 Chat Session 4 – Literature Reviewing and Working in a Scholarly Manner

In this session some examples of student work and how they write down their ideas will be examined based on scholarly principles. This will be followed by looking at a process that applies equally to what one writes and what one reads. The remainder of the chat will examine several excerpts from student work that exhibit common faults. To prepare for this chat read Workbook 8 on citation styles and bibliography, chapter 4 of the notes and Workbook 5 and it might be useful to read through the sample short Literature Review in Workbook 4. In addition, it will be useful if one looks at one's own way of using primary source materials and find some examples that are good and bad.

2.6.5 Chat Session 5 – Aim and Objectives

This chat will focus on how to write an aim and a set of objectives based around a problem definition and a Research Question. To prepare for this session read Workbook 6 sections 6.13 and Workbook 9 section 9.7.3 but also consider one's own project idea and what might be suitable in that case.

2.6.6 Chat Session 6 - Open

This chat will look back over the course and typically review faults that arose out of the assessment of the project specification. This will be supplemented by a discussion as to how various project elements: title, research question and Basic Activity for Generating Data, aim (not aims) and objectives are constructed but focused on the basic Activity for Generating Data.

2.6.7 Extra Chats - Open

For some courses there will sometimes be an open chat on Sunday at 1400-1500 where students may bring their questions, comments, concerns or grumbles. These are useful sessions but only when students come prepared with items that they need to discuss. These are not teaching sessions so the tutor will have nothing to say unless students come prepared with questions and are willing to participate.

3. WORKBOOK 3. PROJECT SPECIFICATION NOTES AND EXAMPLE

This section contains some guidance notes and sample completed project specifications - please consider them carefully. Do NOT copy them blindly – they are just for guidance although the headings to each section are mandatory therefore students must write their own entries under each heading in a way that matches what they want to do. The aim of the specification is to state a complete project plan as clearly as possible so one needs to be concise and precise.

3.1 Project Styles

In projects two styles are commonly found. There are some restrictions on these two forms depending on what programme you are on but the Tutor will advise on that issue. Briefly the two styles are as follows:

Engineering – here you design and build a software application, create a system design etc.

Study – here you design a research program to collect primary data in an attempt to find an answer to an interesting question. For example, one might investigate whether cascading styles sheets lead to simpler accessibility or you might evaluate the role of email management in business success.

3.2 Specification and Design

The following notes and samples for project specifications may help you prepare your own. In summary, one needs to think of the whole processes as starting with a problem definition and ending with a solution (your project outcome) and the element that connects these two things is your research design. It follows that unless you have a good design you will not be able to get from your problem to your outcome and that will mean your project fails.

3.3 Project Specification Headings and Formatting

All the following main headings and subheading must be used and students must not introduce others. As these guidance notes are read it is advisable to also look at the relevant examples in section 3.5 so that one can clearly understand what is being said.

3.3.1 Specification Header

Make sure all your details are entered correctly otherwise work may be misfiled or rejected by the University because we cannot ascertain whose work it is.

3.3.2 Project Title Construction

Project titles must make clear sense in English and not be overlong. See Workbook 6 section 6.14.

3.3.3 Project Task Description

The main function of this section is to explain what is going to be done using the suggested headings below and as shown in the sample. The headings are intended to be precise and if students ignore or change them or use them for any other purpose the work will be rejected. The actual selection of headings will depend on the type of project: Study or Engineering.

Engineering Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct an Engineering project task description and must expect to go over them many times before a concise and useful description is formulated. For Engineering projects please note that a functional description means that one says what the application will do for the users and not how it might be built or what architecture is involved.

Situation Overview – express here a concise and high level description of the existing or proposed application area.

Presenting Problem Definition – a concise definition of some real world problem related to data processing of some kind. This is an important step since unless one can clearly see what the problem is then any solution suggested may be deficient in some way. In most cases the problem definition in engineering projects is related to elements such as data availability, searching, access speed, storage, processing, accuracy, sharing, reporting, entry, updating, deletion, control, security, volumes, segregation, consistency, worker efficiency, process systematization, communication and so on. For the purposes of writing a specification the expectation is that students will focus a problem definition on one major aspect of the application scenario. See Workbook 6 section 6.2 and 6.11.

Real-World Target – a summary of the real world effects that are expected if this problem can be solved or partly solved. (See Workbook 6 section 6.3)

Application Proposal – expressed as a concise description of the main system functionalities. When describing the main functionalities it should be done at a high level and it is recommended that they are all coherent and there should be no more than 10.

Ethical Overview – express here a concise review of any ethical impacts of gathering the primary data, processing it or system usage.

System Architecture – a concise description of the major or main architectural elements of the proposed application

Strategic Value – expressed as a concise argument that the application is able to deliver to the stated problem definition.

Study Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct a study project task description and must expect to go over them many times before a concise and useful description is formulated.

Situation Overview and Problem Setting – a concise, high level description of the context in which the research is set.

Presenting Problem Definition – expressed as a concise statement of the single underlying problem leading to this study. This is an important step since unless one can clearly see and define what the problem is then any solution suggested may be deficient in some way. Study projects look at an aspect of strategic business IT and that might cover technology effectiveness, IT investment, user acceptability, development or improvement plans, feasibility studies, legacy systems and so on. See Workbook 6 section 6.2 and 6.11.

Real-World Target – what desirable real-world effect or effects are likely if the stated problem can be resolved or partially resolved? (See Workbook 6 section 6.3)

Intended Project Outcome, Actors and Data Spotlight – write a concise statement that expresses the expected major project outcome as it arises out of the stated problem definition and your personal theory and would be an answer to the Research Question. See Workbook 6 section 6.4, 6.8.4, 6.11 and 6.5.

Research Question – expressed as a concise question that captures the problem definition and the real-world target along with other necessary features. See Workbook 6 section 6.8.

Ethical Overview – a concise review of any ethical impacts of gathering the primary data, processing it, presentation or usage of results in the form stated

3.3.4 Overall Project Aim

This is a vital point in the specification because in a very concise manner a researcher brings together in one aim: the main project **activity** to get a stated project **outcome** as well as telling us what **data** is the focus of the activity and finally what the purpose or **target** for the project outcome is in relation to real-world problem resolution. It is essential that you fully understand these four elements as described in Workbook 6 section 6.13, 6.13.1 and Workbook 9 section 9.7.3.

3.3.5 Set of Project Objectives

To meet an overall aim it is necessary to achieve a number of milestones indicated by a set of objectives generating minor outcomes. Objectives can be hard to write and it is expected that there would be between 3 and 6 of them. See Workbook 6 section 6.13 and 6.13.2, Workbook 9 section 9.7.3.

3.3.6 Research Design

The Research Design is the core element that generates primary data set and processes it into your project outcome. The Research Design is divided into two phases.

Design for Collecting Primary Data - a process or processes used to define and create a primary data set. It has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the actual data and present that data.

Design for Processing Primary Data - a process or processes used to manipulate the structured primary data set to get the expected project outcome.

A useful analogy for a Research Design is that it is like deciding that you want a sponge cake and then working with a shopping list (a list of primary data that you want) to collect a bag of ingredients (collection of the listed primary data). Once we have our ingredients (primary data) we use a recipe to prepare and mix them (pre-processing the primary data) ready for the final processing step to bake the cake (like generating your form of answer). To reverse the analogy, if you were going to make a cake you would not walk into a shop and just pick up a random set of ingredients and then mix them all together into some muddle, bake it and expect a cake to emerge - no one but an idiot would do that would they?

The suggested headings to use are as follows and you are recommended to use them carefully in a step by step manner to construct a research design. You must expect to go over them many times before a concise and useful design is formulated. In the examples I have added the step numbers for clarity but you do not have to do that in your own work as long as all the elements are present.

Engineering Projects Research Design Format

Research Design Phase 1 – Requirements Collection Process

This phase is concerned with a process that generates a reliable collection of primary data which in an engineering project will be a set of requirements. See Workbook 7 section 7.14.

Define – here one bases the definition of requirements on the outline proposal document.

Location – state where or from whom the requirements can be found.

Collection Protocols – here it is necessary to select appropriate collection protocols such as: interview, observation, records searching and so on needed to collect the requirements under the standard four headings: Functional, Non-Functional/Performance, Technical and Usability. See Workbook 6 section 6.7.1.

Requirements Presentation – the requirements data once collected will typically be presented as interview transcripts, notes and copies of documents and lodged in the project document appendix as a kind of requirements catalogue.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulate it to get a design for the application. This is in two sections.

Overview – show how the various requirements are expressed in a design.

Specific – in any design there will be aspects that have no obvious means of expression and such aspects are typically written as a list.

Study Projects Research Design Format

Research Method – make a selection and write a concise rationale for its use. See Workbook 7.

Research Design – Primary Data Collection process

This phase is only concerned with generating a reliable primary data set and is based on the Basic Activity for Generating Data but to be it has to be surrounded by a complete process.

Activity and Data Spotlight – a concise description of the activity that forms the core of the primary data identification/spotlighting and collection process. It is expected that you will name some primary data items here. See Workbook 6 section 6.9, 6.10 and 6.11.

Location – a concise description of where the primary data may be found. In practice it may come from almost anywhere including extraction from existing secondary sources.

Collection Protocol – a concise description of the actual collection procedure which may be based on one or more of the following: interviews, questionnaires, observation, roles playing, document analysis and so on. See Workbook 6 section 6.7.1

Primary Data Collection Presentation – expressed as a concise description of the way in which the primary data will be presented.

Research Design – Processing and Presentation

This phase is only concerned with a processing the primary data set in order to get the expected project outcome.

Design of Pre-Processing for Primary Data Collection – a concise description of the processes applied to the raw primary data to generate a refined and well structured data set expressed in a fashion that makes it suitable for generating the intended project outcome. (Workbook 6 section 6.7.3) (Please note that this step will not always be needed)

Design for Generating the Intended Project Outcome – here the structured primary data set (pre-processed if necessary) is used in some algorithmic or heuristic fashion to generate the intended project outcome and show that in its final form it can be used by situation actors to gain the target effects.

3.3.7 Literature References

This section is used to assess how well a student has prepared for the project activity. The University will want to see that the reading is current, comprehensive and focused on the topic area. It is expected that work in the specification will be supported from the literature particularly in the outline description and research method sections. Unless the literature is seen to be used in the various sections of a project specification it may not be approved although it is not expected that one cites from every book in a reference list. See Workbook 5 and Workbook 8 and make sure citations are in the Harvard APA style.

3.3.8 Project Planning

The plan must be developed by looking at the outline project document contents list and considering what activities are necessary to generate the various project objects. Aim for around 12 to 20 activities lasting at least 18 weeks with any suitable start date. A project activity is something that is significant and requires planning and monitoring. So for example:

Prepare Metric Program – this is clearly a significant activity that has to be planned and monitored and so properly part of the plan

Select an Organization – this is an activity and might be important but it is doubtful if there really is a significant process involved here that has to be planned and monitored.

Outline Implementation Plan – this is not an activity so should not be in the plan.

The University will examine each plan and will want to see that it is focused on the project – the implication here is that it should be possible to see that a given plan supports a particular project idea not just a copy of one of the samples or is so generic it might apply to any project.

3.4 Testing Your Problem Solving/Research Design

A design must amount to a logical plan that takes a problem definition to a description to the expected outcome that will resolve the stated problem. The following are a useful check that a plan is sound.

Practicality – consider whether one has the resources to be able to carryout a plan. This is a very serious step and must not be taken lightly. It is all very well to have an elaborate plan on paper and to think because it all sounds logical that it can actually be done. In many cases a crucial test of practicality is to be sure that one can get the data from the locations specified.

Credibility – here one is expected to be honest and decide whether the plan will result in useful data and outcome. It is unfortunately true that many research projects end up being trivial because of poor identification of data and more importantly the choice of appropriate collection protocols. It is also worth considering the data processing functions as they must also be credible.

Confirmability – this test is about what would have happened if the same research was done a second time with the same data – would the researcher end up with the same answer. To put it another way, is the processing method too dependant on an individual and that dependence may lead to bias.

Trustworthiness – here we are concerned that the conduct at all stages is such that one could have confidence that the results are genuine and not manufactured.

3.5 Example Specifications

Here are some sample specifications, they are complete except for the contents list and project plans but they are not meant to be copied without any conscious thought and any obvious attempt to do so will result in specification rejection.

3.5.1 Example Complete Engineering Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Engineering) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – the customer is SIS and the application is expected to go live by June 12, 2007.

Project Title - An Assessment Marks Processing Application. (See Workbook 6 section 6.14).

Situation Overview

Currently, the core processing is done by staff members dealing with their own assessment marks, typically using Excel. The staff member then forwards his marks sheets, usually in paper form, to the administration office where the marks are collated using Excel to give an overall score for each student. These two marks sheets: individual unit marks and overall student marks are then presented to the Board of Examiners for scrutiny and acceptance. The process ends when a transcript is sent to each student detailing their results for that semester.

Presenting Problem Definition

The actors feel that the root problem is about consistency and accuracy given the sensitivity of the data but coupled with difficulties with storage, retrieval and reporting. (See Workbook 6 section 6.2 and 6.11)

Real-World Target – the desired effects here are that consistency and accuracy are both improved but at a reduced workload. (See Workbook 6 section 6.3)

Application Proposal

Based on the presenting problem there an application is needed that can offer us consistency and accuracy in the processing of assessment marks, both by unit and by overall student performance. The system to be called a mark processing system and it will have the following main functionalities. (See Workbook 7 section 7.14)

Functional Requirements

1. Store name, address, year of study, name of course and unit details of all registered students.
2. Store the assessment patterns for each unit including weights and pass mark.
3. Allow for the entry, updating and deletion of any or all records.
4. Allow for the entry of assessment marks for individual entry or by batch updating via CSV
5. Report on marks for each unit including basic statistics.
6. Report of overall student performance, including basic statistics.
7. Produce student transcripts.
8. Provision for other ad hoc reports at a later date.
9. Secure access to individual results to be available to students through a portal.

Non-Functional and Performance Requirements

1. Store records for at least 6 years.
2. Allow for at least 6 simultaneous users
3. System must be capable of processing all the data and providing the reports within 10 working days. The estimated current volume is 145,000 data entries and 139 reports but this is expected to grow by about 7% per academic session.

Technical Requirements

1. Be developed in MS Access 2003.
2. For use under Windows XP.
3. All processing activities, including reporting, to be carried out using native Access facilities.
4. All processing is to be done using Access VB and no macros are to be used.

Usability

1. Be developed using normal windows formats and standard colours.
2. Fonts use in screen to be no smaller than 9 point and standardised at Ariel Narrow.
3. Assumed screen size to be 19".
4. Report to be printed as appropriate but with fonts never less than 10 point.
5. Data entry load per screen to be as recommended in DEF 981.90.
6. There should be some consideration of access via the portal for the visually impaired.

Ethical Overview

The collection of requirement here does not present any ethical problems. However, when in use the system contains personal and sensitive data and this aspect must be considered in the design

System Architecture

The intended application is essentially a database system with a web link. It will therefore have two interfaces: one a direct link to the database through the Access application and the other through a secure web interface routed through a portal but with only read access.

Aim

To build an assessment marks processing system using standard MS products in order to ensure consistency and accuracy in the processing of student results. (See Workbook 6 section 6.13 and 6.13.1, Workbook 9 section 9.7.3)

Objectives (See Workbook 6 section 6.13 and 6.13.2 and Workbook 9 section 9.7.3)

1. To produce a detailed, departmentally based, mark processing requirements document.
2. To produce a detailed mark processing database design using standard documentation protocols.
3. To produce a detailed assessment functional design to include data entry, updating, deletion for marks processing and reporting.
4. To design the secure portal for student use based on University entry protocols.
5. To produce and evaluation report of the marks application.

Research Design Phase 1 – Requirements Collection Process

This part of the research design is concerned with constructing a reliable primary data collection for later processing into the form of answer expected. In this case the primary data collection is a set of detailed requirements for the marks processing application. The primary data that we need is related to the proposed major functionalities stated earlier and given to us in the form of a proposal. For each of the functionalities it is now necessary to decide. (See Workbook 7 section 7.14)

Location – The requirements can be found at various locations in Portsmouth. In particular

Detailed Functional Requirements: the appropriate targets for this exercise are: SIS office administrators, departmental course leaders, individual academic staff, Heads of Department and the University registry (for regulatory aspects). It may also be useful to make contact with a number of external examiners to ensure that the reporting arrangements are acceptable. In addition there will be various documents such as regulations and marks sheets

Non-Functional and Performance Requirements: the appropriate targets here are the Registry since they set examination and graduation dates as well as define the necessary reports. The office senior administrator also needs to be consulted for staffing and usage issue. During this process there must be detailed discussion with the department and the Registry over security

issues as this is a major ethical issue. In addition there will be various documents such as regulations, external examiner reports.

Technical Requirements: the appropriate target here is the departmental technical to establish hardware and software profiles. It may also be necessary to discuss network and security issues with the University central computing department. It may be necessary to see network and PC specifications and various security profiles.

Usability Requirements: the basic design is based in Windows protocols so there are no particular requirements to be gathered. However, because it is possible to implement interfaces in a few ways particular usability requirements will be ascertained by use of a mock-up used with the administration staff. With regard to the Portal there will need to be discussion with the University webmaster over formats and protocols to be used. In addition there will be various documents defining standards and formats.

Collection Protocols – The collection is essential a survey format where each requirement aspect will be discovered by just three formats: (See Workbook 6 section 6.7.1)

Detailed Functional Requirements: expressed as interviews, document analysis (marks sheets and regulations) and some observations. It may also be necessary to use observation to examine any existing Portals.

Non-Functional and Performance Requirements: interviews, document analysis (marks sheets and regulations) and observations.

Technical Requirements: interviews and document analysis (system specifications and profiles)

Usability Requirements: interviews and document analysis (system specifications and profiles). In addition it will be necessary to run some focus groups to look at various interface design option by means of mock-ups.

Requirements Presentation – the requirements data once collected will be presented as interview transcripts, notes and copies of documents. These artefacts will be reviewed and a tabular format used to present the requirements and lodged in the project document appendix.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulates it to get a design for the application. This is in two sections.

Overview – here the vehicle used to present the various requirements in a design format will be UML. The mechanism will be to take the written requirements documents and map them to a suitable diagrams in the form of use cases, class diagrams and where appropriate collaboration or sequence diagrams.

Specific - where necessary a written list will be provided. These will mainly be used to state unambiguously the various non function, technical and usability details.

References (See Workbook 8)

Walker (2001), IT Problem Management, Prentice Hall, 0-13-030770-5

Bruton (1997), How To Manage The IT Helpdesk, Butterworth Heinemann, 0-7506-3811-7

etc

Project Plan

Any clear format may be use but a typical format (but not events) can be found at the end of the Study Project sample specification.

3.5.2 Example Complete Study Project Specification

Here is an example study specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Engineering) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Project Title - Quality Control in Program Development - A Possible Strategy (Workbook 6 section 6.14).

Situation Overview and Problem Setting

The research is set in The University of Portsmouth with the School of Information Systems. In that context it will focus on the programs produced by first year computing undergraduate students.

Presenting Problem Definition

The problem for developers is focused on knowing when code is robust and ready for release. (See Workbook 6 section 6.2 and 6.11).

Real-World Target

The benefit that would accrue in the real-world if this problem can be resolved or partially resolved is that developers can detect potential errors at the code stage and hence feel more confident about their product and therefore not risk costly development overruns and compensation claims from clients. (See Workbook 6 section 6.3)

Intended Project Outcome, Actors and Data Spotlight

It is expected that the form of the answer arising out of this work will be a demonstration in the form of a report with graphical evidence that endorses the proposition that Planar Similarity is an appropriate software quality indicator in that outliers can be detected from application code and in so doing produce an error indication protocol and hence the target effect is gained. It follows that the data spotlight will involve calculating various software metrics from application code and inferring a software defect.

It is expected that the error indication protocol will be used by software developers to pinpoint errors in code and hence guide them in the design of generic program templates and in the testing phase and hence help to ensure that product confidence is heightened and cost overruns do not occur. (See Workbook 6 section 6.4 and 6.5)

Research Question

What (**interrogative**) software error identification protocol (**outcome**) based on use of the planar similarity metric, is available to software development engineers (**actors**) to ensure that software applications are ready for release (**problem**) in order to meet development time scales and ensure client satisfaction (**target**) by examining its efficacy in pinpointing software defects at the code stage (**spotlight**)? (See Workbook 6 section 6.8)

Ethical Overview

There are no current users of the process being developed and at this stage there not seem to be any ethical consideration of importance. However, it is necessary to explain to the students supplying the sample programs the purpose of this study and assure them that none of this information will be used for assessment and allow them access to the results if they so wish. If the target actors use this method then it would possibly expose programmers competences to managers and this may have a negative effects if it is seen not as an aid but as a kind of assessment of their abilities.

Aim

To report (activity) on the efficacy of the Planar Similarity measure using simple metrics as a means of finding outliers in program code (spotlight) and hence reduce coding errors by means of an error identification protocol (outcome) leading to development cost reduction and client approval (target). (See Workbook 6 section 6.13, 6.13.1 and Workbook 9 section 9.7.3)

Objectives (see Workbook 6 section 6.13 and 6.13.2 and Workbook 9 section 9.7.3)

1. To model the application software construction process based on an extensive literature review.

2. To report on appropriate simple and synthetic metrics that might be used as indicators of quality in application programming code.
3. To define a process that will extract the defined metrics for any piece of application code.
4. To document a suitable statistical process for reducing the metric values set to just two dimensions.
5. To analyse and report on the data, including outliers, and hence derive some general conclusions regarding the utility of the Planar Similarity metric and its error indication properties.

Research Design - Research Method

This research is aimed at giving an indication (loosely proving) the efficacy of the Planar Similarity metric within a given context. With this in mind simple experimental procedure will be used as described below. (See Workbook 7)

Research Design: Primary Data Collection Process

This part of the research design is solely concerned with constructing a reliable primary data collection for later processing into the report outcome defined earlier.

Activity and Data Spotlight

The basic idea is to compare a new piece of code with an existing piece that is known to be sound and calculate a series of metrics each one that might highlight any differences and so indicate an outlier. (See Workbook 6 section 6.9, 6.10 and 6.11)

This study will define 20 software metrics which will be calculated automatically for each sample programme. The metrics that form the primary data collection for this research will be such things as: function density, function count, cyclomatic complexity, data associations, decision count, decision density, number of variables, number of function calls, etc. (see Workbook 6 section 6.7)

To set up this experiment three computer program specifications will be drafted with the students working in 'C++'. The specifications will be written so that the defined software application is, in each case, of a different application style and progressively more difficult. An expert in 'C++' will produce a set of generics to match the requested programmes types – it should be noted that a generic is an outline or skeleton of certain kinds or classes of program.

Location – The sample frame is all first year students on computing courses at Portsmouth University. This is around 350 students and my calculated sample size is 200 students, however, since the data collection process is automatic all 350 students will be used in this study.

Collection Protocols – students will be given the application relevant generics and the specifications and asked to write three computer programs of increasing complexity, one in each of three semesters and deposit their completed programmes into a drop-box. This is a large data set and for practical reasons an application will be written that will process each student program so that metrics may be calculated automatically and stored in a suitable electronic file. (See Workbook 6 section 6.6.1)

Primary Data Collection Presentation

The sets of primary data will be available in the project document appendix and will be presented in tables where the rows represent the sample programs (one row for each sample) and the 20 columns the metric values.

Research Design: Processing and Presentation

This part of the research plan will take the whole collection of primary data and manipulates it to get the expected outcome form, which was a demonstration in the form of a report.

Design of Pre-Processing for Primary Data Collection (See Workbook 6 section 6.7.3)

The metric data sets will be read directly from the files produced in the collection phase and then statistically processed to define a similarity measure for each program using principal component analysis and multidimensional scaling. The outcome of this processing will be pairs of values, one pair for each sample program, suitable for plotting in two dimensions structured as a table of results for each program tested.

Design for Generating the Intended Project Outcome

Once the graphs are available it is then a simple matter to look for outliers in particular and attempt to explain their distance and orientation from the generic and other programs in the group by a close examination of the underlying program code that gave rise to it.

The contention is that similar programs will cluster together and ones that are different (even though the specification was the same) will show up as outliers and can be identified and examined to see why that difference occurred. It is hoped that the results will be similar for all three program specification involved and hence demonstrate that planar similarity is effective software metric. Hence, by examining outliers and linking those to code fragments it will be possible to review the results and generate my report on a efficacy and a protocol for error identification. (See Workbook 6 section 3.5.2)

References (See workbook 8)

JKM Quality Assurance Handbook (Company Confidential)

Garlick, F. J., (1993), Planar Similarity - A New Synthetic Metric, SQM, Elsevier, 1-85312-225-4

etc

Project Plan - Master Schedule expressed in weeks (You may assume that a project take about 18 weeks to complete)															
Dates are Mondays	March				April				May					etc	
Event	6	13	20	27	3	10	17	24	1	8	15	22	29	etc	
Literature Search															
Identify metrics															
Write Metric program															
etc															

4. WORKBOOK 4 – LITERATURE REVIEW & STRATEGIC IT VALUE NOTES/EXAMPLES

This is a sample of what is expected in assessment 1a, however, it only shows two elements: the strategic business IT statement and the short Literature Review. Try to keep in mind that this is just ONE example and do not try to copy it blindly or try to fit it into what you want to do.

Strategic IT Value

This work was based on trying to resolve or partly resolve the problem of low quality code leading to the need for costly re-work at later stages in the development cycle. The importance strategically of this work is that the outcome: a definition of new software metric will imply that it is possible to identify poor application code and this can be done at an early stage in the software development life cycle. The importance of this is that corrective action can be taken early in the development cycle and as a consequence costly re-work late in the cycle can be avoided or reduced. A secondary or added value element is that the results will allow the identification of good programming standards and this in itself will also lead to improvement and strategic advantage on all products delivered.

Tutor Comment

The key element here is that one relates the expected outcome or form of answer to its use in resolving the problem theme that was the basis of the project, and hence demonstrate a strategic business IT value. Failure to create a clear argument based on the problem theme and outcome leading to a strategic business IT value will mean loss of marks.

Literature Review (See Workbook 5 section 5.1, 5.6, 5.7 and 5.8)

Hiskett in his 1987 seminal paper on metrics defined several apparently useful metrics, the best known of which are 'program vocabulary' and 'program length' which are essentially metrics that count operators and operands and their usage in a given piece of code. Hiskett's metrics are easy to calculate but he was unable to show any strong correlation between his measures and program quality as defined by experts in the field. Similarly, Rogers and Hamerstein tried to use Hiskett's metrics as predictors of MTBF in accounting software but the results were inconclusive and no link could be found between the metrics and the type of software (functionality), accounting in this case, and the metric used.

Garlick, Sheene and Southwood (1999, p450) attempted a new approach that involved the notion of similarity, which they called planar similarity – that is two programs could be defined as similar because: they are written in the same language or they perform similar functions or they were written to the same standards or they are written to the same specification or they were written by the same team or finally they perform the same function. Their work is aptly summed up in the opening paragraph of their paper:

"The nature of any true measurement is easy repeatability and this implies that the style of measurements form a suitable metric space. This means that we need to define the nature of the similarity before we define a measure. In principle this is simple since it is easy to name the similarities but in practice it has been difficult to articulate a precise definition."

The similarities described above deserve further explanation but here only two of them in combination are used: similar language and similar or same specification. Similar language is easy to understand but at first glance it would seem that if two different programs are written to the same specification they are bound to be the same. However, after a little thought, it is obvious that if two different people write two different programs to the same specification the programs are certain to be different in many respects. It follows that the basic, though loose, hypothesis is that if planar similarity can detect a similarity (alternatively difference) in these programs - written to the same specification but by different people - it might be possible to use planar similarity to detect differences between two or more programs against any defined mode of similarity. Conversely, if it cannot be shown that a similarity exists between two or more programs written to the same specification then there is no hope whatever of showing any other kind of similarity with this metric.

Two final points need to be considered: what exactly is meant by software quality and why would a similarity measure be a good indicator of quality? To answer the first question we have only to refer to Kitchenham's 1998 paper where she defined five kinds of quality, briefly:

Transcendent View – quality is a kind of innate excellence, something felt rather than seen.

Product Based View - quality is related to the content/attributes of the product.

User View – quality is seen as equivalent to fitness for purpose.

Manufacturing Based View - quality is equated with conformance to specifications.

Value Based View - provide product at an acceptable price and conformance to a specification.

In this study the transcendent view was the one chosen as the basis of the definition of quality. The meaning of this view is defined by experts in the field – that is, can an expert in, say, Java programming make a judgement as to whether a given piece of code is good or bad – well, here it is argued that such an expert can and does such tasks routinely. Curiously there is very little literature on this idea of expert opinion within the software community but Gavin as early as 1978 touched on the subject. However, it is a reasonable conjecture and it will be used in this study – interestingly, if it can be shown that planar similarity can detect similarity (or equivalently differences) then it would also support the conjecture that experts can judge software quality.

Finally, the study will rely on the ability of experts to judge quality in software. This judgement is exemplified in the production of exemplar or generic programs. Garlick (2003, p98) has written extensively on this subject and the work is well known and will not be fully reviewed here. However, it is possible to define classes of program modules - validation, input, calculation, reporting and so on – it follows, that using the idea of similarity it is useful to create a standard or *generic* program or module for each class. Such a program can then act as a base line for all planar distances related to its application class and hence be a measure of similarity (or difference).

Using Garlick's idea we can let experts define our generic and then use that to compare with other programs – if we declare a difference then in simple terms we need to look at that program because it might be of poor quality and conversely if we declare no difference then we can fairly conclude that the program is sound.

Tutor Comment

The literature review is supposed to be a student's own work. As such it is a discourse that outlines the major elements of topic area but amounts to an essay which is the student's alone. In practice this means that students must read deeply into the subject and then weave what is read into what the student already knows or believes in order to create a useful summary of the topic that will form a strong base for carrying out the actual primary data research - this implies that you 'master' the subject area and become expert in it.

It follows from the above that if all you do is copy or paraphrase from various sources without any significant comment or analysis on your part then it amounts to plagiarism and is worthless.

One final point is that when you write up your review in your final project document you should use various sub-headings and other formatting elements to structure the section to make it readable and meaningful.

5. WORKBOOK 5. LITERATURE REVIEW

The main function of this review is to ensure that one's mind is prepared with all the specific problem area knowledge that it needed to carry out the project and its primary research. In practice this implies the rather difficult task of integrating different ideas, theories and experiences into a thematic, informative, complete and clear discourse on your chosen subject area.

Preparation of the mind is done through adding your own critical evaluative comments and ideas on what you find in the available literature and such critical reviews are typically hard work and not about downloading a few articles from the internet. The key characteristic of the greatest thinkers in history was absolute and unswerving honesty in all their thinking and that principle has never changed. They used their intellect and reasoning abilities to the full. They were honest no matter what the subject be it religious, political, business or academic. These men would not accept dogma from religion, politics or academic sources without subjecting it to serious critical questioning and of course this often meant great suffering for them.

5.1 Plagiarism

The KEY is honesty – without that your work is worthless – you may be able to fool some people but as Shakespeare said “This above all: to thine own self be true, and it must follow, as the night the day, Thou canst not then be false to any man.” So when you plagiarize I may not know, the University may not know but YOU will always know that you obtained something falsely.

Plagiarism means passing off other people's ideas as if they were your own in short it is a form of stealing or cheating. It is fully expected that students will carry out research prior to completing a piece of work. This may include the use of books, journal articles, reports, manuals, notes and so on as source material. The material may be public, restricted to a closed set of people or with a security classification, or privately communicated. The principles are the same whether the material is on paper or in an electronic format. When you refer to an idea in a piece of your own work, it falls into one of several categories:

Common knowledge - many people know it and the information does not belong to anyone person but it cannot normally be deduced by you it has to be learned. It is probably talked about in several sources: the world is round, computers contain both processors and memory, OO is routinely used in software construction and so on. If you are sure that it is common knowledge, you do not need to cite a source. Be careful, authors will often write down in their own work things that are common knowledge so quoting them in that instance amounts to saying that a bit of what is common knowledge actually belongs to that author and that of course is an absurdity.

Obvious – many people know it and the information does not belong to anyone person but it can be deduced. It is probably talked about in several sources: companies tend to grow as time goes on, when the sun goes down it gets dark and so on. If you are sure that it is obvious you do not need to cite a source. Be careful, authors will often write down the obvious in their own work so quoting them in that instance amounts to saying that what is obvious to every one actually belongs to that author and that of course is an absurdity.

Published – this refers to an idea that is found in a specific source or sources which is not common knowledge nor obvious but is nevertheless useful – in these cases you must always cite the source or sources of such an idea.

Original – you may include freely original ideas of your own. However, be aware that if the reader sees an idea that is not cited and is not common knowledge nor obvious, then they are entitled to believe that either it is a new idea published by you or you have plagiarised it. It follows, that if you are introducing idea of your own it is necessary to make that clear by the way it is presented.

5.1.1 Identifying Plagiarism

Plagiarism does not occur only when you copy words verbatim. Plagiarism is about ideas, and even if you express the idea in your own words, you may still be guilty of it if you do not credit the source. However, expressing an idea in your own words might often be good scholarship. The difficulty is that anyone can copy and paste a phrase, sentence or paragraph and cite its source. This is technically not plagiarism, but it's often very poor scholarship since it is obvious that such an activity tells us nothing about the learning, if any that has occurred

Scholarship is about showing your understanding and criticism of ideas. Simply copying, paraphrasing or summarising can show understanding only to a limited extent. You need to “add value”, that is make your own contribution to knowledge, to what you've read and you can usually only do this by expressing published ideas in some way and mingling them with your own thoughts and ideas.

5.1.2 Common Critical Devices

Try to infuse your work with your own thoughts and ideas and let these mingle with what it is you have found in the literature. The most common forms doing of this are:

Interpretation - explaining and expanding on what you have found.

Criticism/Questioning – critically discussing by questioning in order to judge whether the ideas are good or bad.

Decomposition or Analysis – to tease out the constituent parts of an idea.

Synthesis – by means of discussion and explanation link separate ideas together.

Selectivity - showing which ideas to include and which to discard.

Abstraction - taking an overview or defining a model or framework, usually by looking at examples.

5.1.3 Common Literature Tools

The following are the most common means of incorporating, in a scholarly fashion, the work of others into your own written work (a fuller discussion of these tools may be found in the notes).

Copy – use the exact words using quotation marks. A quote may in principle be any length but a good rule is that each quote should only carry a single main idea, which you want to use and then you must introduce it and then follow it up with discussion.

Paraphrase – expressing something that you have found in the literature in your own words - the intention being to simplify, explain, or interpret a complicated idea. But take care there is a very fine line between simplifying, explaining and translating something and just being lazy about adding anything to what you have found.

Summarise – producing a précis or abridgment of a part of the source we have found. Essentially one is trying to capture the main points in an argument or description.

Analyse – the purpose here is to offer a detailed examination of some whole by scrutiny of its parts.

Synthesise – here the idea is to take parts and put them together into a new whole for some purpose.

You might find it useful to remember: copy in order to discuss, paraphrase to simplify, explain or interpret, summarise to capture the main points, analyse to understand and synthesise to build something new.

5.1.4 University Review Assessment

When the University looks at your Literature Review it will be trying to decide if you are committed and prepared for the topic and working at Master's level. If your work is poor in terms of structure, content and form you will find yourself failing. This is NOT necessary so long as you put in the work and ensure you understand how to use citations and the literature. I want to encourage you to do good work - it will ensure that you pass well and it makes your work a pleasure for the Examiners to read.

5.2 Review Content

The review is about your topic area and about you becoming sufficiently expert in it to deal with the problem that you have uncovered. The intention is for you to offer a discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (Notice the acronym FRAMED)

Focused – this means that your whole effort is focused on the topic area and the particular aspect of it that you are pursuing. So do not be tempted to add in other things just because they might be useful, interesting, and novel or you just have nothing else to say.

Relevant – any topic area aspect will itself normally represent a large body of knowledge and so one needs to continually ask if a particular element in the knowledge domain is relevant to your particular study.

Authored - any literature review is to be written by its author. This sounds obvious but it is all too easy to fill up a review with cited quotations, paraphrases, summaries and so on so that the 'hand' of the review author is not evident anywhere in the work. When this happens it is not an evaluative review at all but

simple plagiarism. The author's 'hand' must guide and direct the review in an evaluatory fashion so that the review is a message from the review author and not a recitation of what has been found elsewhere. Typically this is done by using one's own skills and knowledge to introduce, comment, add to, modify and extrapolate from various primary sources available.

Measured – this is a matter of selecting and using the focused and relevant materials that you have found. Unfortunately, it is all too easy to pack in information in excruciatingly precise detail and so end up with a laboured entry that treats your readers as if they were completely ignorant of the subject area. So here one needs to just say honestly "is the entry a measured response to my and my readers information needs".

Evaluatory – authors sift through the primary sources looking for materials to use. The essence of this sifting is an evaluatory outlook based on an awareness of your problem theme, your topic area and your own ideas. Care is needed because this process is not about searching for materials that you agree with or like in some way. Instead it is a contextualised response (what do you already know) and that may mean you find materials that are new to you, materials that make you change your own knowledge base and often materials that completely replace what you thought was solid.

Dialogue – a review is a form of argument because good ones are based on a strong theme and in them one is trying to explain to, and convince your readers about something and so it is best if you think of it as a kind of dialogue in which you vicariously challenge them about your review theme and content.

5.3 Integrity and Evidence

This heading sums up research - integrity because it must be your own work and evidence because you MUST be able to show that your results have value. There are basically 4 strands to good work as follows

Dogma – this simply means things you have to take at face value. Most often they are things that are not open to reason in the sense that one is not allowed to question them and in some countries you can find yourself in serious trouble if you do. The problem with dogma is that by definition there is no logical support for it. Just to use a simple example, some faiths require you to have a beard or not eat pork as a matter of dogma – in such cases we usually cannot logically deduce that this is a right or wrong. It may of course be simpler than that since we all invent our own dogmas from time to time – for example it may be very simple such as 'I will never buy a Ford car'.

We all accept dogma but that really is not the issue – the issue is that we should not accept it without some critical thought. There is at least one rational way of exercising critical thought on dogmatic issues and that is asking is the outcome of actions based on it good, bad, neutral or at least does not harm anyone. The trouble however, is that dogma sticks to us like super-glue and we will often go to great lengths to defend it and almost always this is done by sophistry (worthless arguments) and of course the notion of what is good or bad is not easy to define.

Reason – this is the ability to be logical and reason about what it is you are reading or writing. That is you are encouraged to ask questions and seek for a deeper understanding. This may imply that you accept new information, modify what you already know or reject something as no longer valuable.

Honesty – here we are talking about not taking things at face value and being honest with yourself about what you are reading or writing and asking does it all make sense and is it coherent with what I already know.

Motive – this aspect is about your reasons for wanting to read or write something. Now such motives can be high minded or they may be base. One must therefore always guard against tendentiousness (the author simply wants to convince a reader of something and may use any means to do it) in one's own writing and be watchful for it in the writing of others.

5.4 Literature Sources

The available literature is classified broadly speaking into the two kinds described below and ideally we only want to use primary sources.

Primary Sources – that is the first published documents. One can be really pedantic and say the real primary sources are the author's manuscript or autograph but these days we are satisfied with published sources. It will however, often be difficult to establish that something is indeed a primary source.

Secondary Sources – in almost every document you see, there will be elements attributed to other authors – these are then secondary sources.

Be careful not to confuse the above definition with those for primary and secondary data. When we talk of primary sources we are obviously referring to something that is published and exists whereas with primary data it will not exist until a researcher defined, locates and collects it.

5.5 Basic Writing Rules

For Study projects a full literature review will be needed but in Engineering projects the requirements document forms part of the Literature Review. However, even in Engineering it is necessary to write a short review just to form a technical backdrop to your project. It may help you to remember there are two cardinal rules when writing – they are simple:

Respect – always have a deep respect for ones readers and make it easy for them to understand what you are saying.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying. The key task is to formulate ones own ideas, in your own words but one does this by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

5.6 Literature Assessment

When assessing this element the University will look at how YOU use the sources in what you write and at the range of sources that you use. If either is judged deficient your work may not be accepted as the view taken will be that you are not prepared for work at this level and on this topic. It is expected that all your sources will be mostly primary ones. If there is some reason why this is not possible it must be discussed with the Research Methods tutor or your project supervisor.

5.6.1 Literature Review Ideas

All the following steps are iterative and you must expect to go backwards and forwards many times before you get a review with which you are happy.

Reading/Writing with the Intellect - This is normally thought of as a four stage process that applies equally to what is written (because it is going to be read by someone).

Understanding – this is simply taken to mean that we understand the words used.

Interpretation – are able to find meaning in the words used.

Evaluation – we ask does the meaning have any value – in essence we ask is it true or false.

Contextualization – this implies that everything we read is coloured by what we already know. This idea is taken much further in the idea of hermeneutics (see the notes).

Usage – the literature that you find and evaluate can be used to supplement your own work and demonstrate your mastery of the topic area. This does not mean that you quote, paraphrase or summarise everything you see. As a rule of-thumb: only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation.

Argument - Finally, keep in mind that when writing you are dealing with a form or argument where you are trying to persuade your reader about some point or other and that should only be attempted when you are knowledgeable, the argument is essential and you have a deep respect for your readers.

5.6.2 Literature Review Construction

Here is a plan that you can use to construct your own review. It is not infallible and will require conscious effort from you and it must be based on a thorough evaluation of the literature.

Step 1. Purpose - the purpose is to fully prepare your mind with all that you need to know about the topic area and the particular element of it that you are focusing on. The idea is that what you write shows your mastery of the topic and in fact you have become an authority on the topic area. So a review is not a long list of quotes, paraphrases and summaries, it is an evaluatory discourse. That is, readers will want to know what YOU have to say based around what you have uncovered in the literature - so readers must see what you have found and see what you have to say about it.

Step 2. Topic and Aspect - Make sure you are clear about your topic area and which particular aspect of it you need to explore and understand in order to be able to effectively carry out your planned research.

Step 3. Select a Theme - Use your project problem definition, target and outcome to guide you in selecting a theme that will connect all the various elements of your review together making it a lucid and progressive discourse. (Don't be afraid to alter the theme as you go along if that becomes necessary)

Step 4. Your own Views - Try to make a list of your own views, ideas and knowledge. Remember, the review is an evaluation of what you find not a recitation of it. If all you do is tell us what you have found you may not even pass because almost anyone can write a review on any subject if all that is required is to more or less recite what has been found. So you must structure the review around your theme and your own ideas and thoughts.

Step 5. Make a Review Content list - Based around your theme make a list of all the various topic strands that you need to know about. It may help you to think about strands such as: organisational, administrative, functional, social, technological, cultural, ethical and so on or some other structure best suited to your topic – but it must be progressive and logically take you through the topic area. This is not about writing down everything you know it's about giving your readers a focused discourse on your chosen topic area. Commonly it is found that it is useful to start as follows.

5a. Basic definitions and terms that need to be clear for the core topic area. (Be careful to note any abbreviations)

5b. Map out several important areas or problem space dimensions. Now it is impossible to be general here so for example if I were looking at mobile devices and their use in business I might map out the following elements: value, attitude, use, limitations, practice cost, ease of use, learning curve, effectiveness and so on. Please be careful here to look for significant things not just drag in anything and everything. Once you have made this list you may add to it, modify it or discard from it as you go along.

5c. Work out how you want to end the review - often this just sums up your point of view but you may have other ideas

5d. You may like to include some statistics if that is relevant. But don't let this run away with you and so the review just becomes some sort of justification based on statistics. Remember, statistics almost never tell us anything about the topic itself and only tell us things related to the relative importance of certain things we have identified.

Step 6. Literature Searching - Armed with your theme and list of elements start your search for suitable material but be very careful to record the exact details of where everything may be found and checked. The search may start with the Internet or a special tool like Google Scholar but must move on to respected publications.

Step 7. Structure - The final step is to structure your themed list of topics using headings, subheading, paragraphs, bullets, tables, diagrams and so on in order that we get a coherent and lucid discourse on your chosen subject area. This is not a trivial matter and you must expect to go over it many, many times before it is really an example of your very best work.

5.6.3 Reference and Bibliography

References are to primary sources that you use in the text of your written work. A bibliography is a list of sources you have identified as useful (including references) but not necessarily used. The University will look very carefully at any references to see if you are prepared for study at Master's level in your chosen topic area. Overall, the expectation is that you will list at least 10 sources. For each source you must consider its:

Currency – looks at publication date and be aware of changes in technology. In technology books are soon dated.

Completeness – Make sure you are looking at the final version not some draft or abstract.

Uniqueness – is the source a primary one

Coverage – Use your list of sub-topics to ensure that you cover all the areas required so that you are fully prepared. But make sure that you are not including multiple texts with essentially the same content.

Range – Make sure you have a good range of authors.

Authority – ask is the text authoritative. This can be done by considering the author, publisher, writing style and currency. It is also possible to use citation indexes to see how often the source has been used.

Accuracy – Is the information correct? If you cannot be sure then you must not use it.

Relevance – Make sure that your sources are relevant to your project topic.

Usage - The basic usage strategy is:

Find – Relevant texts using a library index, the internet, online book stores and so on.

Evaluate – Once you find a possible source you must evaluate it for content and relevance.

Contextualise – that is fit this new source into your personal knowledge base.

Cite – If you use a source it must be listed in your reference section and cited in the text correctly.

Discuss – You may include something from a source in your work as a copy (quote), paraphrase or summary but in all cases you must introduce it, comment on it at cite its source.

5.6.4 Evaluating Internet Resources

When using internet resources it pays to be careful and always sceptical because of the following factors:

Anarchy - anyone can publish just about anything on the Internet

Validation - authors do not always have their materials checked by an authoritative third party

Tendentious – when the author wants to convince you of something and will use any means to do it.

Honesty - authors may not always be what they seem and may assume personas, lie or make false claims

Consider – the motives of those who publishing on the Internet

Trust - in research trust nothing until you have good cause to do so. This is the opposite of what we do in our daily lives in that we tend to trust until we have reason not to.

Context – be aware of the context of what you find. For example is it a University site, is it a manufacturer and so on.

Accuracy – this simply means is the information correct. You need to be aware that information might be validly collected but still be quite inaccurate.

Validity – this means that we ask is this a valid source in the sense that it was constructed in a reliable manner. Any lack of information on proof readers, editors and publishers means that mistakes are more prevalent than in print and therefore increased scope for innocent error and for outright deception.

Authority – this means was the author competent to create this material. For example any one could have an interest in say Emotional Intelligence and quite easily create an internet article on that subject but it would not have the same authority as that of a University professor who has spent years researching the topic.

Uniqueness – here we are asking is this an original work (a primary source)

Completeness – this may simply be described as asking if the work is the final and finished version. You need to be very careful here else you might find yourself using the material from the earlier part of the work which in fact was augmented at a later stage.

Coverage – this means what is the scope of the source. Now this does not mean that a source will cover everything on a given topic but it should be clear as to what it is covering.

5.7 Citation Examples

The following set of examples is intended to show some often poor use of citations and also some sound ones. These examples should be studied with care so that the flaws they illustrate may be avoided. The quotes are from a range of sources and topics and in your study of them you need to concentrate on the form. Now assume all the following were all written by the Research Methods tutor so the comments will be offered in the first person as if he is talking to you

These are just simple examples and they do not imply you must use italic or indenting as that is only used here to show clearly the pieces of work being looked at.

Example 1.

Lyau & Pucel (1995) found a link between training and productivity for their sample of Taiwanese car part manufacturers. Bartel (1994) found that training is a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors. Bishop (1994) and Barron, Black & Lowenstein (1989) both found that training increases management estimates of productivity.

This is poor because I only told you what the cited authors said. I did not introduce the author's words, nor discuss them and it's almost impossible for you to see what point I am making other than the obvious one that productivity and training may be linked – in effect it is not my work at all and there certainly is no sense of evaluation here. We might have written

Many authors (Lyau & Pucel 1995, Bartel, 1994, Barron, Black and Lowenstein 1989) found a link between training and productivity and that training is often a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors ... followed by your comments/discussion/analysis etc

Example 2

It has been found that because Arabic words were written by copyists who did not use vowels that over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that it looks as if I attributed the entire paragraph to Noldeke. So you can have no idea which part of the paragraph was my own thought or maybe none of it was. This is bad practice and some tutors even regard it as blatant plagiarism. The fact is that tutors when they see this form in will automatically assume that all the student has done is paraphrase what he has found and none of it in effect is representative of any student thought and will mark the work down because of it. It could have been written as follows:

There has been a long standing problems with some early Arabic manuscripts in that many words have become obscure and even in context they are still unclear. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowel, over time the meaning of some words became lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use "assonance analysis" to study word endings and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes.

You can use the bracketed form if you just want what amounts to passing reference to a source as in the following example.

In two recent works (Harding 1986a, p.80; 1986b, p.138) it has been suggested that ...

Example 3

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that "change in organisations is an inevitable consequence of growth" – this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdal is clearly obvious and that by Briggs is common knowledge. Also it is not entirely clear that the second sentence leads logically from the first one. The point is that using citations here was unnecessary and therefore worthless. *We might have written.*

It is obvious change in organisations is an inevitable consequence of growth and in the modern world that must imply continuous IT progression and updating. Many authors, notably St Clair-Tisdall and Briggs have commented on how these naturally progressive elements may be factored usefully into a company overseas sales policy and....followed by your comments/discussion/analysis etc

Example 4

Suppose, in your reading you come across the following in a book by Noldeke. But the bit that interests you is by Frederickson – how will you set about properly using and referencing the Fredricksons quote?

Tools are needed if we are to measure software quality in a meaningful way. The idea of quality, as we know, is intangible since many views are possible. It follows that we must define some terms in order to measure quality. It is useful to note what Fredrickson said: "Definitions of what quantities we need to measure in order to assess software quality are at present arbitrary since as far as we know they have no connection with functionality".

This does not mean that they lack a rationale, but simply that professionals disagree on the definitions themselves and so it follows that

In this case the correct way is to find the Frederickson book and use that because it is the primary source. Quoting from secondary sources will only be tolerated in proven cases where the primary source cannot be found or for other reasons is inaccessible and it must be done in the correct manner as shown in Workbook 8 for secondary sources.

Example 5

Can you work out what the following extract from a piece of student work is saying?

It is argued that tacitness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

The sentences is obviously copied as it is very, very unlikely that any student would write with such academic complexity and obscurity – lines like this are not designed to communicate they are designed to impress the reader not further his understanding. What it in fact it is saying is that some skills are very difficult to duplicate and this may mean that growth may be restricted. We might have written.

Fahey in his 1989 monograph has stated what should be obvious but he nevertheless less shows conclusively that companies often do not realize that some skills are very difficult to duplicate and this may mean that growth may be restricted or if you like it's not all that easy to copy a skill. ... followed by your comments/discussion/analysis etc

5.8 Literature Reviewing Cautions

Writing a literature review is a difficult and time consuming task if it is to be done well and there are no short cuts to sound scholarly work so here are some final pointers.

Justification - A literature review is NOT a justification for your research idea and such a review will never be regarded as explaining to the reader the topic area and your evaluation of it. Justifications often take the form of filling up the review with statistics but such an approach carries no real value in convincing the reader that you are master of that topic area.

Structure - It is very common to see students write down things in a literature review as they occur to them. This practice might be fine for notes but it is obvious that the way thoughts pop into ones mind or information is discovered is often anything but logical or structured. To communicate in writing effectively you must impose some structure on what you write else readers will not be able to see any progression in your thought or in the topic.

Pretence - some students try to be scholarly and pack their work with quotations and paraphrases – this then become not an evaluative review of what was found but a recitation of it instead. It is correct and desirable to tell your readers what you have uncovered but unless you make comments and add your own views on what is found the work will be regarded as a worthless recitation.

Non Review - some students just write down what they know without any references to the literature – this will always lose you marks as no one will believe that you obtained that information by your own brainpower without any outside assistance.

Experience – students often claim that what they write is all down to experiences but again no one will accept that. The way you use experience is in your evaluation of the sources, comments on them and building up your own arguments.

Inclusion – Preparation of the mind for your topic area does not mean you write down everything you know that might be relevant. What it does mean is being focused on your topic area and becoming expert in that. For example, an Engineering project where the literature review contains page after page devoted to telling the reader about every conceivable life cycle is hopeless and in such cases there is almost no thought over what is written and so it is worthless. Similarly, if a study project was looking at eCommerce as a way of selling drugs then page after page telling us about various drugs, treatments and prescribing practices is worthless in the context of just selling drugs. It's not volume is wanted but considered content.

Common Knowledge and Obvious - Quoting or paraphrasing material that is either obvious or common knowledge implies that you have not looked at the sources beyond the first page or forward. Here is an example from a project document. "Poston (2000) stated that organisation expected ERP systems to deliver improved performance". This is worthless as it is obvious that they would want this and to say it makes no valuable point at all - its no good trying to say things like this as if Poston was enunciating some law of the Universe or a point of huge importance on some new and valuable angle related to ERP - no he is just stating the obvious.

Bad Citations Style - It is very common to see the citation form (Briggs, 2000) placed at the end of a sentence or paragraph. This can ONLY mean that all you have done is paraphrased, summarised or copied that section. This practice is more or less plagiarism and is representative of a very lazy attitude that assumes that just expressing something in your own words is a valuable contribution - its is not because YOU are saying nothing and what you are supplying is not really your own work at all.

Activity Definition - Some students use the Literature Review to tell us what they are going to do in the research. This will result in a zero mark as what is to be done is covered in the Research Design so repeating it here is valueless. This practice is a certain sign of laziness.

6. WORKBOOK 6 – MAJOR PROJECT ELEMENTS

This workbook is intended to help students formulate clear project elements but here that what is said here is a mechanical process and it is your responsibility to make sure that what is written down makes sense.

6.1 Scope and Scale

Scope and scale are meant to be considered carefully otherwise a project which is out of control and way beyond your capabilities in the time available may occur. Alternatively, the scope and scale may be set so that the problem becomes trivial and the idea is rejected. So please take note of what these terms mean as far as this course is concerned.

Scope – this means something like selection or choice. So for example, if I were looking at training in desk-top packages I might select just Excel or I might select Excel and Access and so on to focus on. The point is I set my scope by being selective.

Scale – the means something like number or extent. So for example if I set my scope as looking at Excel I now need to set the number of users I will include in my study.

Scope and scale are two dimensions that set a frame around your work to bring it into sharp focus and exclude everything else. You need to put limits on both these dimensions but it is most important is to be clear about scope – that is, what exactly to include in your study, normally, just include ONE significant thing.

6.2 Presenting Problem

In any project it is usual to choose an area of knowledge and practice to be its topical focus. For example, one might choose modern usability issues, automated network management, digital paper and so on. Once one has a topic area it is necessary to choose one problem theme within it to be a sharp focus for a primary data research effort whose aim is problem resolution or partial resolution leading to a strategic business IT significant benefit. In general, it is not all that easy to give a simple and all embracing definition of the notion of problem but the following has proved to be useful.

A problem or issue is something that is a matter of concern or debate within the topic area and whose resolution might bring benefits. (Checkland 2003)

In practice this means a problem is an object not an activity. For example, stating the problem as “how to ride a bicycle” is incorrect since this is a question about the problem - the problem is “riding a bicycle”.

Another difficulty is that students often write down the problem in such a way that it is an answer or solution to the problem. So for example, if one writes a problem statement as “lack of training” then implicitly that is a solution as well. When this happens it is almost certain that the writer is not thinking about the problem at all but is obsessed with a particular solution. In this particular case the real problem might have been “errors in data entry” and one of many possible solutions is training.

6.2.1 Problems are Rarely Simple

It is easy to become blasé about defining a problem and this is often compounded by our desire to get to a solution as quick as possible – therefore I urge you to take care and thoroughly analyse the problem. There are perhaps three elements that need to be understood.

Reduction – it is desirable to simplify problems but that may also mean that you oversimplify and so one ends up with a very inadequate problem definition or model and of course if you do that your solution may fail in part or even totally.

Context – every problem exists in a context of some kind and we often call it “the problem situation” and if you are to have any chance of an adequate understanding and definition of the problem you must appreciate the context in which it exists. To give a simple example, on this course writing an adequate Research Question is problematic for students because the ideas will be new, they are working full time, they have family commitments and so on – these things affect your ability to get this work done. But for me writing a Research Question is relatively easy, because my context is different: I have experience in this area, I am retired so no work pressures to contend with, I don't have to worry about failing and so on.

Perspective – everyone has a different perspective on any given problem. For example at work you may see a particular problem one way but your manager may see it in quite a different light. Now, we cannot help taking a perspective but we can be aware of it and try to moderate its affect on the way we define the problem.

6.2.2 Defining the Problem

It is a good idea to construct one's own definition of the problem and to do it in as few words as possible. Notice, that it is your own definition not one you might look up in a book or on the internet (though you might start with that) because there is often little learning value in just copying a definition as far as deepening your own understanding is concerned.

Remember, that any definition one constructs will not be absolute and accepted by everyone - but in research this is not a problem as long as the researcher makes it clear what particular definition is being taken. Do not take this process too far and end up with either over-complicated or trivial definitions - they must be thoughtful and comprehensive. So it is recommended you start by thinking about six things where the acronym CCC-APE (stated as "triple C APE") is used:

- Characteristics** – observable features or facets of the problem idea,
- Context** – every problem exists in a context of some kind and it must be understood
- Causes** – every problem will arise due to some causes or causes
- Associations** – every problem will have links to other situation elements,
- Perspective** – when a problem is encountered it will always be from a certain perspective
- Effects** – say what effects ensue in the real world if the problem is not resolved.

6.2.3 Defining the Problem - Example

Let us suppose that a student has identified the problem theme as Phishing. Naturally, the student will be concerned that this is a good idea and would like confirmation of that before expending time on it. One can ask the course tutor, but he/she is not expert in everything so at best one would only get an opinion as a response so how should a researcher proceed. So for Phishing a researcher might note the following:

Characteristics: illegal, intrusive, upsetting, preys on those who trust their fellow man, etc

Context – phishing may occur at home or at work and in both these situations one naturally feels comfortable and secure and our systems may be well protected. However, that context can lull one into trusting the messages we get and it is exactly that element that the fraudsters want to exploit

Cause – it seems the cause is to do with greed or wanting to harm someone and feel, rather sickeningly, pleased in being successful at it. Notice an interesting thing here – mostly knowing the cause helps you to solve the problem but here most would say it's insoluble but possibly preventable.

Associations: email, chat, file sharing, etc.

Perspective: management (but try to look at it from several perspectives as well)

Effects: destroys confidences in the system, may lead to personal or company losses etc

Normally, it takes quite a few attempts before a definition that is lucid and comprehensive is obtained. Remember, the definition must also be useful within your research study – that is, it's no good having a well formed definition that does not offer a sound basis for a research effort.

Now here is a first attempt

In the modern world email is a technology that almost everyone uses whether in the home, at work, on the move and indeed it seems to follow one around. Typically, email is a simple one-to-one message passing technology but it is now offered with enhancements that include voice, video, chat, file passing, file sharing where suppliers are attempting to present a complete communication environments. With such a technology come problems and one such problem is identity theft and one way of getting this is known as Phishing. In its simple form an unknown, but apparently authentic, source asks for personal details and then uses them for fraudulent purposes. The problem is identity theft using email systems where a message poses as a legitimate requestor in order to fool the recipient into thinking it is legitimate request. The problem in computer system is known as Phishing.

Here is a final attempt (but most often there are several intermediate attempts)

Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as legitimate request. The intention therefore is to fool the recipient into trusting the message and releasing information which can subsequently be used for fraudulent or other harmful purposes.

6.2.4 Cautions on Problem Definition

The acronym CCC-APE is just an aid to formulating a definition so one should not worry whether something is a characteristic or an effect - that does not matter very much because the whole idea is to uncover problem aspects and expand one's understanding of the problem theme.

As a very rough guide one often finds that the final definition must come down to about a third of what we start with. In most cases if one is familiar with the subject it is possible to create a good definition in about 1 to 2 hours and then if necessary update it as your project progresses as it is almost certain that there are elements that have been missed or imperfectly understood.

6.2.5 Problem Size

It is hard to measure the "size" of a problem because there is no scale on which to gauge it. But one can look at three aspects to get some idea.

Observable Effects – think about the effects of the existing problem and try to assess their seriousness in terms of the context in which it is set. In simple terms just ask "is it worth solving".

Causes – as was stated above, mostly knowing the cause helps you to solve the problem but some problems are so complex or so embedded in human nature that solution is impossible so in those cases we go for prevention.

Form of Answer – perhaps a better guide is to think about the form of answer and see how extensive, important and how hard it is to get. For example: one student wanted to deal with password overload – a clear problem with which we are all familiar but his outcome was a set of guidelines on how to construct good passwords but in my view that was a trivial answer to the problem because those guidelines can be found almost anywhere and it is doubtful if that goes anyway to solving the overload problem.

6.3 Project Target

When you think of a problem you normally do it in relation to its effects. It follows that you have to think very early in a project about what effects will be generated if you can resolve the problem – these real world effects are called the project target. Normally one settles on one major target although it is permissible to list more than one. Targets are effects so these are typically introduced by a verb form (increase, reduce, remove, reduce etc) and tend to be such things as: improved accuracy in data entry, to gain infrastructure resilience, streamlined workflow and so on.

6.4 Project Outcome

It is obvious that at the start of a project we do not have its outcome – but we can have some idea what its form may be. Therefore if we know our target we can speculate about what project outcome credibly might generate or go some way to generating the desirable target effects if used by situation actors. Outcomes are objects and so are typically expressed as nouns: Here are some examples:

The target of "improved accuracy in data entry" might be generated by a project outcome of a training needs assessment report or a training plan for use by departmental managers.

The target is "to gain infrastructure resilience" might be generated by a project outcome of a revised backbone design or a set of recommendations for new technology for use by the IT development team.

6.5 Situation Actors

Whenever you state an outcome you must always say who will use it (called the situation actors), how they will use it and hence show how the target effects are achieved. If you do not do this with care one often ends up with a worthless outcome because it is unusable or unsuitable.

6.6 Speculation

It is often useful when thinking about the solution to a problem theme to think of it as based around or generated by some personal theory a person holds about that problem and its setting. Essentially, one gets at this theory by speculating about causes and possible solutions routes. It is not easy to say how to speculate but it can be said that it is aided by a thorough literature review, personal experience and a deep consideration of the problem theme perceived in a given situation.

For example suppose the situation was related to issues with application software implementations in business not being as successful as expected. Recognition of this problem theme is a first step but if one is to do something about it, it might be useful to thoughtfully speculate on why success is lacking in this area. It follows that one might speculate that this lack of implementation success is due to poor implementation

strategies, or poor user training, or poor project management or any number of things. Notice that there will always be rival speculative ideas and that is why one must be thorough in looking at the literature and using your basic knowledge and experience to open up the problem situation in order to at least have a credible theory as to the most probable solution route otherwise one might just waste time on chasing nothing of value.

Do not let this idea run away – this is not about natural laws of the universe such as Ohms law or Archimedes Principle – here one tries to establish a personal belief about a situation and its problem theme. So after speculation one might express ones personal theory about the above example as follows.

It is believed that implementation of application software is proving difficult and this may be due to poor implementation strategies. It follows that if this is the case and better strategies can be defined then implementations may prove more useful in the future.

Notice that my theory points to a particular form of answer to this problem theme and in this case it is related to perhaps a document that explains how to formulate implementation strategies based on a consideration of user needs, application intention and business objectives. Occasionally, the theory may be embodied in a scientifically constructed hypothesis but more often than not in technological research it is expressed informally as an idea.

6.7 Primary Data

Primary Data is data is new data in the sense that it will not exist as a set until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data set is representative of some aspect of the area under investigation and can be processed to get a defined outcome that will resolve or partially resolve a stated problem theme when used by situation actors. All projects must be based on the collection and processing of primary data.

6.7.1 Primary Data Collection Protocol

Within every project there has to be a collection protocol for the practical collection of the primary data. Every complete protocol will have 5 features:

Vehicle – this is the primary mechanism or technique employed by the researcher, typical examples are: interview, questionnaire, observation, role playing, seminar, focus groups, document searching and so on

Recording Profile – this describes how the data will be physically recorded. Typically we might use: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria – this is a profile that allows the researcher to know that he/she has a valid sample point from which data is to be collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. If we do not have a profile we may not have any consistency in our data and it may therefore be meaningless.

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable in the sense that they cannot be ethically used.

6.7.2 Project Purpose in a Nutshell

Students sometimes get confused over what a Master's project is about. Consider a topic area like Digital Paper which is likely to be a very hot technology in 2008. A Master's project is not about producing a long narrative on Digital Paper explaining what it is, how it is used and what the technological infrastructure to support it might be. A Master's project is about identifying a problem theme in Digital Paper and then collecting and processing primary data into a form that helps you resolve that problem theme based on ones own personal theory. With this in mind, consider the following examples.

Example 1. Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them – is that primary data and is this a valid research purpose? No because in the first place one might just regard the manual as listing the functions anyway so in effect the data already exists, secondly, this is just one book and so its content might be complex, trivial or totally unrepresentative.

Example 2. So if I extract (my basic activity) instances of phishing (my problem theme) from an email log that would be primary data because even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data) as a set did not. My purpose being to process this collection of primary data to find out the most common sources of phishing and express my findings in an evaluatory report (my form of answer) to be used by my managers to eliminate or reduce successful phishing cases.

Example 3. If I conduct interviews in order to describe (my basic activity) a user purpose regarding illegal downloads (my problem theme) in my company with selected employees the interview transcripts are my raw primary data because the transcripts did not exist before the interviews took place. My purpose being to process this collection of primary data in order to develop a policy (my form of answer) to control illegal downloading activity for use by IT personnel in monitoring internet activity.

Example 4. If I look through written reports (secondary data) on security violations (my problem theme) for a particular company with a view to identifying (my basic activity) the root cause of each violation then even though the violation reports exist the list of root causes (my primary data) did not so it is primary data. My purpose being to process that collection of primary data to create a strategy (my form of answer) that will alleviate or remove certain kinds of violation in future when used by security managers.

Example 5. If I plan to build an application for processing student MSc marks (my problem theme) then I need to ascertain (my basic activity) the system requirements (my primary data). My purpose being to process this collection of primary data to create a design (my form of answer) for the marks processing system which can then be used by software developers to produce a working application.

6.7.3 Pre-processing Primary Raw Data

In many cases it will be necessary to process the raw data that one collects into a structured form of some kind so that is easier to use when generating the final project outcome. For example, if we have a series of interview transcripts it is obvious, that in that form, they are not easy to use so we might perform a pre-processing phase to get the core data into a more structured form that then constitutes our primary data set before the main processing phase that generates my project outcome is carried out. For example, suppose I examine company documents on misuse of IT system resources by employees. In this case I might proceed in two ways to get my structured primary data collection.

In line processing – that is I define my structure before I start and then as I come across a misuse example I structure it there and then. However, the disadvantage here is that you have to continually look back to see that you are not recoding the same data again and again from other incidents and so it tends to disrupt the collection process and make it longer to complete.

Pre-processing – here I wait until I have been through all the documents and then I use my set of notes to systematically work through the whole raw collection and form my structured collection that way.

6.8 Writing a Research Question (Study Projects)

This is intended to encapsulate your whole project idea and intention into one lucid question. Ideally one wants open questions that request information in the form of an answer. Questions can sometimes be like commands used to elicit a response and others such as "Would you pass the salt?" looks like a question but in fact is a request or action, not for an answer. In Research Methods, however we will only look for questions that elicit information.

The simplest questions implicitly or explicitly request information from a range (finite or infinite) of alternatives and these are often called bi-polar questions but more generally question ask for information that includes explanations, description and definitions. An interrogative word is a word used to start a question. All questions have a natural structure to them and that structure can change dramatically when you change the interrogative. In English the following is a list of interrogative words although some of them are rather old fashioned now.

Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.

6.8.1 Questions that are not Questions

It is often difficult to write something that in English could be taken as a question. Now I am sure that in daily life everyone knows how to ask a question but when you write something down you are entering another world. Consider the following two lines – would they be understood as proper questions?

How to sharpen a pencil? Or What a pencil can do for you as a student?

Now these clearly ask for information but if you spoke these fragments to someone they would not quite see it as a proper question – in English such fragments would be understood as a kind of heading to a list of instructions for sharpening a pencil or a list of the benefits of using a pencil. That is that they imply that someone is giving you an answer not a question.

6.8.2 Basic Research Question Forms

It is best when attempting to construct a question to think about what sort of answer to expect – now in normal everyday life we do this instinctively. For example, you would not say “is this the right way to Pablo’s restaurant” if you wanted actual directions because that question form could only give you a Y/N answer. Instead you would probably say something like “how do I get to Pablo’s restaurant from here” and reasonably then you would expect an explanation. Broadly speaking there are four sorts of answer:

Bi-polar answers - Essentially questions that imply a limited range of possible answers. Typically, a bi-polar question starts with a word such as WHAT, IS, CAN or DOES.

- Is it possible to sharpen this pencil? (Y/N)
- Does it make sense to allow children to sharpen pencils (Y/N)
- Can a blue pencil be sharpened easily (Y/N)
- What is the common view of staff about using blue pencils? (Disagree, agree, etc)

Bi-polar questions can of course be useful but more often that not they have no great utility with forms such as “Can a green pencil be used in place of a red one?” Well of course it “can” be used so the answer is bound to be YES and so the question is pointless.

Explanatory answers – where the expected answer is an explanation and it is often in the form of a procedure or process. Typically, explanatory questions start with ‘HOW’ or ‘WHY’. For example, “How can a pencil be sharpened safely by young children?”

Descriptive answers – where the expected form of answer is a description most often in the form of an evaluation. Typically, these questions start with WHAT or WHY. For example, “What is the purpose of HB0 pencils?” (a simple explanation) or “Why are HB0 pencils difficult to sharpen?” (an evaluation)

Exploratory answers – where the expected form of answer implies an exploration of something. Typically, exploratory questions start with HOW or WHY. For example, “How should we use HB1 pencils best in drawing figures?” (often an exploration leads to an explanation)

The most common interrogative words to start questions are: what, where, would, in what way, can, is it, why, which, where, how, does, who, why and do – whatever word you use, always ask what form of answer is implied by each of them. You must be sure that whatever form you decide on as answer that you can actually construct it and when it is constructed as part of your research it is in fact useful strategically in some way.

For example, suppose I decide that the form of answer I want is “The role of technological innovation is business success”. The task you now have is to ask yourself whether you know how to express a role (write it down if you like) and whether knowing about this role will be of any use.

6.8.3 Research Question – Why are we asking it?

In normal everyday life questions come at us more or less all the time. Sometime we just answer them but more often that not we have a tendency to ask “why do you want to know”? It is therefore always useful when setting out your research question to ask why you asking it. That is you say to yourself, if I have the answer to this question then there will be some good outcome because of it. Sometimes we embed in our questions why we are asking them but mostly we do not. You will see later however, that you will have to make the reason plain in the aim so one might as well think it through at the question stage as well.

6.8.4 Research Question Form of Answer

For any Research Question there will always be several possible forms of answer arising out of ones personal theory about a problem situation encapsulated in the question. Ideally one would like the research question to be worded so that ONLY one form answer is possible and that is the one our theory suggested but often that is not easy to do so one normally has a range of options and competing theories to choose from so one looks for a form that interests you or looks to have the most utility. Do not be tempted to have multiple questions all in one sentence or look for multiple answers since it is better to focus on one significant output form. Table 4 lists the main forms of answer to help you when considering your personal theory.

Category	Typical Interrogatives	Expected Forms
Bi-polar	does, is, are, what, when or can	A list of possibilities
Explanations	how, why, who or where	A report, a model, an equation, a theory, a design, an evaluation etc
Explorations	How, who or what	A list, explanation, a comparison matrix, a pattern, a survey report, a theory etc
Descriptions	What, who or why	A report, a process or procedure, a model, a policy, a strategy, a theory etc
Table 3. Research Question Outcome Possibilities		

6.8.5 Strategy for formulating a Research Question

There is no easy way to do this and no real templates for it either so a good formulation will require some clear thinking and effort and that will show the examiners whether you are at Master's level or not in your thinking skills. A typical structure that you might use can be remembered by using the acronym IO-APTS. Therefore the IO-APTS elements are:

Interrogative – what is your key interrogative word (how, why, what etc). You should note that some interrogatives need to use two words if a proper question is to be formed. For example, “how” on its own will not normally make a question but when you say “how can” it is clearly a question.

Outcome – here one asks what sort of answer and what form it might take. Answers might be yes/no, an explanation, an exploration, a description which may be expressed at the end of the project as a report, a model, a list and so on.

Actor – the person or persons who take the outcome and use it to get the target effects

Problem – focusing on a single significant problem and be as concise as you can.

Target – what effects will be observable and measurable in the real world if you can resolve the problem. Effects are things such as efficiency gains, provide or enable better communication, increased accuracy and so on.

Spotlight – put the spotlight on where the primary data or information needed to answer the question might help come from.

Generally, the Research Question should ask always about the outcome and who will use it to solve the problem to get the target effects. However, the order in which the question features go in the sentence is largely governed by the interrogative used. It follows that it is possible to write the question in several ways depending on the interrogative used. The interrogative “what” is often used and then a good question seems to use the features in the order: Interrogative, outcome, actors, problem, target and spotlight. Here is a student work example:

What (**interrogative**) portfolio of accounting best practices (**outcome**) can be identified for use by junior personnel (**actors**) to avoid billing delays (**problem**) in order to improve the quality of response to customers (**target**) based on an examination of the initial accounting processes stages (**spotlight**)?

I used “what” here because I am looking for a process and this interrogative seem very appropriate for that kind of outcome form. Depending in what we want we might end up with a different interrogative and a different question format. Suppose we did not want to find the best practices but just explain why the current ones do not work then we might write the following but as you can see we get a slightly awkward sort of construction when we try to add the outcome and the actors.

Why (**interrogative**) is the current portfolio of accounting best practices (**spotlight**) as used by junior personnel creating long billing delays and poor quality customer response, (**problem**) expressed as an evaluation report (**outcome**) for use by application consultants (**actors**) to ensure there is an informed (**target**) management personnel on possible process changes.

Whatever interrogative you use you must always fit in the 6 features to make it comprehensive and this will often require a little ingenuity. One very common error that you must guard against is asking how the outcome can be used because in most cases it is obvious. To use a trivial example, one often sees questions that say things like “How can I use my training as a driver to drive a car?”

6.8.6 Meaning in a Research Question

This section has looked at the structure of a typical Research Question but it **MUST** be thought out step by step and even then one has to think does it make any sense, is it a focused question, what sort of answer should I expect and so on – there is simply no substitute for careful thinking.

Once you have formulated your research question and have a good idea what form the answer will take then its time to test it using the following ideas. Now be aware that this is just a test of structure and of itself it does not mean the question makes sense – there is no way to do that other than using your own brainpower and common sense – if it makes sense to you it will probably make sense to whoever else looks at it.

English – does it read correctly in English as a question?

Paraphrase – if it's a good question you may be able to ask it in several different ways – so try to do that until you get a formulation, perhaps with a different interrogative, until you are happy with.

Bi-polar – this means that the question has a fixed and limited range of answers such as “Y/N”, “bad”, “good”, and “excellent”. This type of question can of course be useful but the problem with them is that such answers do not have much utility – that is they do not tell you anything of value in terms of what action or actions you might take. You are advised to avoid such questions for your project.

Discussion – look at your question and honestly ask ‘will this question produce discussion?’ – what this means is to ask ‘who am I writing this question for and would it interest them’. Try not to think that you are doing this for your Research Methods tutor but try to think what you would do if you were trying to get funding for research to get an answer to the question from someone.

Answer Form – try to work out what form or forms the answer will take (typically: bi-polar, explanation, description or an exploration) – if you try to avoid this aspect you may find yourself in serious trouble with your research.

6.8.7 Common Errors in Research Questions

The following are typical errors found in student written Research Questions – they can all be avoided if one takes just a minute to think through what has been asked and what sort of answer is likely.

Not a Question - to an English speaker the following would not sound like a question, instead it would sound like a heading to a list of instructions or a procedure. "How to make business application development productive at XYZ Corporation?"

Multiple Questions – It is never a good idea to try to put TWO (or more) questions into one as in the following example - one is about testing and one is about bugs they are quite different things. "How can software bugs be minimised and the testing cycle shortened in the development process of an Inventory System?"

Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example below and it is easy to see that the answer to the question is bound to be YES - of course a productive work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this. Similarly, it is easy to explain how a better development process can increase productivity.

"How can a better business application development process increase the productivity at XYZ?" or

"Can a productive work-life balance be achieved with telecommuting for technical personnel?"

No clarity about each IO-APTS feature - I would recommend that you add in brackets the 6 feature names as I have done above when you write your question.

Each IO-APTS feature occurs once - this is important because it's again all about being clear what each feature is and helping the reader understand what it is you have written.

IO-APTS features in some cases may be combined - you may do this if the question sounds more natural to you but be careful that you really do know what each feature is.

Confusion with target and problem - this is often caused because a student gets muddled up about the effects wanted and what the actual problem is. Again when we see this it makes us wonder if you have understood the very basis of your own project idea.

Confusion over target and outcome – this is perhaps the most serious error and it would imply that you do not understand the most basic distinction.

Please remember that it is possible to write a very poor question that exhibits more than just one error type and yet has all the required features - there is simply no substitute for thinking about what it is you have written.

6.9 Primary Data Generation with Activity and Spotlight

Based on a problem theme, theory and the form of the project outcome expected one needs to formulate a process to create a structured collection of primary data. There is no algorithm for doing this and one has to go carefully through the steps: define the data, locate the data and decide on a protocol to collect that data reliably.

Activity – this is also known as a Basic Activity for Generating Data (BAGeD). All it means is that one has to do something (an activity) to get the data and these activities must inform you how to write down the data. Possible activities might be: account for, collate, assess, profile, illustrate and so on. Notice that activities like “interview” are of no value here because they don’t tell us what to do with the data. That is we can say “profile the inventory management staff” because it tells us what to record as data (profiles) but although we can say “interview the inventory management staff” we now have no idea what data we are looking for.

It is an idea if the activity is just one verb and list of useful verbs can be found in Workbook 16. One needs to be careful here that the activity is clear since almost all verbs need to be qualified or supported by stating their object. For example, if I were to say, “look at fault logs for my primary data” then that is very indistinct because it does not tell us what to look for (the object of the looking). But if I say, “look at fault logs to describe instances of SPAM attacks” then I now have a more distinct activity because I know what I am going to write down as my primary data. The whole primary data collection process is then fitted around that basic activity and the spotlight described below.

Primary Data Spotlight - The core of this primary data generation process is to find an activity which we can use to extract data and coupled with that we must have a primary data spotlight (usually we just say spotlight) that is focused and illuminates just the primary data that you want.

As an example, suppose the problem theme is the value of IT training. Clearly a lot of money is spent on training so it might be really useful to know if there is a link between it and productivity. Suppose we speculate that the link is to do with essential business working practices and these change over time to meet new needs so that what I need is an outcome in the form of a process model on how one identifies changes in business essential working practices and links them to a training initiative.

Now that I have my outcome as a process model the activity (BAGeD) can become **describe changes in essential working practices** of key operational staff – thus, my activity is “**describe**” and the primary data spotlight will be **changes in essential working practices**. Now that I have this core activity and spotlight I can work out the full process of getting to the data and processing the resultant collection to get my process model (outcome) that describes the link between business essential working practices and training.

Once the activity and spotlight are clear it is an easy step to say how that data will be collected. In the above example I might use interviews with relevant staff. In summary the whole process becomes **describe** (activity) **changes in essential working practices** (spotlight) using **interviewing** (collection protocol) with relevant staff.

6.10 Getting an Activity and Primary Data Spotlight

This can be quite hard to do but it is essential to find this activity and spotlight. So we are looking for an activity and we hope that activity can be used with the spotlighted data. There are only three real considerations:

Problem Area Expertise – it is obvious that you need to have gained expert knowledge in the topic area and in the particular aspect related to the problem theme you are dealing with. Unless you have thoroughly prepared by using literature reviews and/or other means you will simply not be in a position to know enough to be able to decide competently what data it is possible to collect.

Intended Outcome – fix in your mind that you are trying to generate as an outcome and recall that whatever primary data you collect will be first formed into a structured collection during the pre-processing phase, which follows immediately after collection, and then that structured collection will be used to generate, in some defined manner, your outcome.

Let us suppose the outcome is to be a set of guidelines, so you have to think what sort of primary data is needed to be able to generate the guidelines and that might be to look at current practices. Once we have the data on current practices we can move on to finding out how to generate guidelines from that data. This means you must know what a guideline is and how one is constructed and that is where secondary data comes in. So in this case you might look at text books or journal articles to find a guideline model to use. Additionally, you would look at examples as well as look at any relevant company or international standards.

Collection Protocol – the last thing to consider is can the primary data be collected and if it so, what is the best way to do that. So it's not a matter of just choosing anything that comes to hand, it is a serious practical consideration based on a thorough and logical analysis of the sort of primary data that you want.

In the guidelines example above, the idea might be to use a questionnaire and one has to ask would a questionnaire allow for the collection of the data I needed. Let us suppose that the data we spotlight is related to finding guidelines for IT media and usage. Now a questionnaire can easily get media data but it is not clear how it could capture usage data so I might decide to get that information by interview instead because I want a richer picture there - guidelines are largely about usage so that is where I must direct my effort.

To elaborate, usage is a complex issue and if you try to get it with a questionnaire you must have a very good idea what the usage processes are otherwise you may miss lots of things that are going on in the company setting. Whereas, if I use an interview, I have much more opportunity to explore the usage idea and that is what I really want.

6.11 Problem, Outcome, Activity and Spotlight Examples

Consider the following further examples which focus on the activity and data spotlight and its link with some theorising or speculation about an expected project outcome. In each case several possible outcomes are listed but in a research study only one would be chosen for further work.

One needs to be careful – this all sounds fine, even simple but a researcher must seriously consider if a complete process built around the activity and spotlight can be formulated in order to get at the necessary primary data within the time and other resources that are available.

Problem - Loss of competitiveness in Hong Kong SMEs

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A list and description of investment constraints or
- A strategy to deal with the investment constraints or
- A feasibility report on e-application implementation or
- A post implementation review report or
- A prediction reacted to the effects of the constraints

Let us suppose that I choose a list and description as my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on reviewing (activity) investment plans and the corresponding strategic plan in order to describe (spotlight) an investment constraint (Generated Primary Data). So my primary data will consist of a list of identified and defined investment constraints.

Problem – Data losses associated with non-effective IT business systems

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A process of data criticality categorisations or
- A user guide to data criticality or
- A DRP/BCP policy document or
- A report explaining how data and criticality are related

Let us suppose that I choose a DRP/BCP policy document my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on listing data categories and using these categories I review reported critical incidents related to data categories (spotlight) in order to match (activity) the category to the criticality of the incident (Generated Primary Data). So my primary data will consist of a list of categorised critical incidents.

Problem - Supplies continuity in manufacturing systems

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A evaluation of a modern supply change process or
- A feasibility report on RFID or
- An implementation plan for RFID or
- A model that shows how improvements may be made using RFID

Let us suppose that I choose to list and describe expected benefits of RFID as my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on describing (activity) supply chain (spotlight) tracking problems (generated primary data) and by a process of evaluation of each problem theme I suggest how it might be alleviated by RFID and hence an implied supply chain benefit. So my primary data will consist of a list of categorised problem themes in supply chain tracking.

Problem - Business productivity in sales staff

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A feasibility study on IM and its use in offices or
- The definition of a training programme or
- A series of factors that must be in place before IM adoption or
- A cost/benefits report on Instant Messaging Technologies or
- The design of a regular monitoring scheme to assess effectiveness

Let us suppose that I choose a cost/benefit report as my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on analysing (activity) call content (spotlight) to identify the sort or calls and then extract the cost (generated primary data) and assess the sales benefit and by process of evaluation arrive at my cost/benefit report on IM technology. So my primary data will consist of a list of calls and their associated cost and sales benefit.

6.12 Writing an Hypothesis

Hypotheses are not always needed but if used they must match your research question and amounts to you saying what you think to be true in a given situation. When you do this your work then become a process whereby you try to show that your hypothesis is valid. There are three stages: firstly write the null hypothesis, secondly write the alternative hypothesis and lastly write down the dependant and independent variables. Unfortunately many new researchers seem unable to do the last part of this process. Let me illustrate.

A student wanted to write a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (Dependent). Now this will ONLY makes sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified.

In research people tend to treat the idea of hypothesis in two ways and the second way is often quite valuable in many research situations.

6.12.1 Formal Experiment

To set up a formal experiment one creates or identifies two samples: one exposed to some effect and one not. For example, suppose I were looking at whether a new diet called lose-weight-quick worked or not. I could set it up a hypothesis and look for samples where some people were exposed to the new diet and some were who were not. The experiment then amounts to seeing if there is any significant difference between these two samples. (See CN.001 Notes for how to set up a formal hypothesis)

In a sense we are trying to prove the diet works but that notion of proof needs very careful understanding. The point is that it is very likely that the diet will work for some in the sample and not for others. So our proof carries a qualification which is that all we could reasonably say at the end is that the diet is likely to work for a large number of people (or not as the case may be). A second point is that we do not usually do thousands of

similar experiments and so at best our results for a limited sample would be tentative. Notice that this outcome is quite different from an experiment that sets out to verify a natural law like Archimedes principle or Ohms law where the amount of variety is much, much less and of course such natural laws have been tested many thousands of times so we are assured of their validity.

Strictly, proof means that something is true for everyone, for all time and everywhere and it is obvious that that kind of proof is very hard to construct in technology. What we therefore tend to do is not to use the word proof but rather say that our research “indicates” that something is generally true. So for example, it is impossible to prove (for everyone, everywhere and for all time) that CRM system bring productivity benefits at low cost but our research might be able to indicate that this is often the case for those who use it.

6.12.2 Informal Idea

Instead of using a formal null hypothesis we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies, surveys, quasi-experiments and so on to demonstrate this. Notice that we are NOT proving anything here only suggesting that something may be generally true within certain parameters.

6.13 Writing an Aim and Objectives

For each project we want one overall aim and a set of objectives that collectively will generate the project outcome. An aim/objective is expressed as an activity to get a defined and measurable outcome within the scope of the project. The essential difference is that the aim expresses the target (or purpose) for the whole project outcome whilst objectives generate minor project outcomes that collectively allow us to eventually generate the project outcome and hence achieve the target.

6.13.1 Project Aim

This derives from the Research Question and is best thought of as expressing the overall activity and intention of the project to generate an outcome that can be placed in the project document or made easily visible to the examiners.

You will note in the aim structure that follows that the problem theme is not usually explicitly mentioned and we infer what it is by looking at the target. The reason it is not included explicitly is that when one does one tends to get very awkward constructions linking problem and target so we might see absurdities such as “to improve website accessibility because web site accessibility is problematic”.

The most common aim structure is as follows where project outcome is its most essential part because this is what the whole project effort is intended to generate. The structure can be remembered by using the acronym AOST.

Activity – what principal activity will be used with the available data to get the project outcome? Ideally, look for a single activity that sums up the whole project process for generating the intended outcome.

Outcome – this element says how the project outcome will be expressed knowing that this outcome will later be used to generate the real world target. What ever you say here **MUST** match with whatever outcome you state everywhere else in your specification.

Spotlight – where will the basic data used by the activity come from?

Target – what is the real world intention? That is the project outcome should be useful in the sense that it addresses the real world problem theme on which the project is based.

Aim – to create (**activity**) a website structure design (**outcome**) using cascading style sheets (**spotlight**) in order that it might be used in design to improve web site accessibility (**target**).

Sample Faulty Aim 1 – “To create an improved network infrastructure”. This is unsatisfactory because we have no target - we know that there will be an improved infrastructure but we don't know what effects that will have. So is improved infrastructure the outcome – it cannot be because it would imply sending to Portsmouth for marking some object called “improved infrastructure” and that is an absurdity. So here we have no target and no outcome and we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

So if I just use the above example it would be possible to have a target of a reduced network down time because of the Improved network infrastructure but that could **ONLY** happen after the project completes and in the project one could generate an infrastructure design - now that can be completed within the

project period and later used to build the infrastructure which can then be used to generate our reduced network down time. Another factor here is that we cannot measure whether something called improved network infrastructure (what scale would we use?) has been achieved unless we have a target such as reduced down time which of course we can measure.

Sample Faulty Aim 2 – “To build a Wi-Fi implementation strategy”. This is unsatisfactory because although we know the project outcome is an implementation strategy we do not know what value it has in the real world because we have no target. Notice also we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

6.13.2 Project Objectives

The aim expresses the project outcome but to get there we normally have to pass through a number of minor outcome milestones on the way and these are expressed as being generated by objectives. Since we are looking for minor project outcomes milestones that collectively deliver the project outcome we have a little problem here because any project is made up of a series of tasks from generating page footer to evaluating the project outcome. It follows that some tasks will generate a minor project outcome and some will not.

Objectives are not the same as making a project plan because they are ONLY concerned with activities that generate a minor project outcome - a schedule of interviews is a project activity but that schedule can hardly be regarded as a project outcome, it is just a step along the way to getting the primary data – so one might add that into the project plan but it would not be written as objective.

The structure and features expected in a well-written objective are as follows where you can use the acronym AMSB.

Activity – Ideally we look for the principal activity that will generate a minor project outcome that can be expressed in a form that can appear in the project document.

Milestone – in this feature you state the milestone as a minor outcome, knowing that it must be in a form that can be written into the project document and represent a sequential step building toward getting the final project outcome.

Spotlight – what is the data area focus of the objective's activity?

Bounded - objective outcomes must be achieved and available within the project period and must not refer to anything that might occur after the project document is completed and submitted

Example – To explore (**activity**) and model (**milestone**) the current software development process (**spotlight**).

This is **bounded** because we can do it within the project period and it is also a **milestone** (building block if you like) leading to my project outcome of a best practice portfolio in software construction.

It is easy to become completely muddled with objectives and one source of this muddle is the distinction between a project objective: something that a student can do and evidence in the project document and operational ones: something that has a real world effect that might happen after the project has been completed. In simple terms if you set an objective in your project it must be completed within the project time scale. Let us just take an aim and look at some possible objectives.

Aim = To survey (**activity**) workers in Southampton (**spotlight**) and report (**outcome**) on how they use the bicycle as an aid to mobility (**target**) in a modern urban environment.

Sample Objective 1 – “To identify and list (**activity**) in a report (**milestone**) the components of a modern bicycle (**spotlight**)”. This is fine since clearly it is something that you can do, evidence in a project document so somebody else could check what you have done and it is clearly bounded.

Sample Objective 2 – “To describe (**activity**) how a bicycle functions”. This is no good since although it is clear that you can develop a description, no one can check it unless you write it down and it is not clear where we would look for the data. Better to say “To describe (**activity**) by means of annotated diagrams (**milestone**) how a bicycle functions by observing it in use (**spotlight**)”

Sample Objective 3 – “To understand (**activity**) how a bicycle helps urban workers (**spotlight**)”. This is no good because there is no clear spotlight so there is nothing to focus ones understanding on and even if

there were no one else can check your understanding because there is no milestone. Better to say, "To prepare (activity) a report (milestone) explaining how urban workers could be helped by the use of a bicycle in their daily lives by examining typical patterns of mobility for office workers in Southampton".

Sample Objective 4 - "To ensure (activity) that workers get to their office on time by using a bicycle". This is no good because there is no way anyone could do this activity and if you cannot do it no one can check what you have done. It also sounds more like an aim than an objective because it hints at a target. Better to say "To report (activity) on bicycle usage strategies (milestone) that might be applied by urban workers to ensure they get to work on time by identifying and observing regular cyclist's usage profiles".

Sample Objective 5 - "To implement (activity) a bicycle repair system". This is no good because although it is obvious you can do it, it cannot be checked in your project document because it is an operational activity and not a milestone that can be documented. But you could say "To produce (activity) a design document (milestone) for the creation of a bicycle repair centre by examining manufactures basic requirements for business applications of this nature (spotlight)".

Sample Objective 6 - "To ensure (activity) that bicycles conform to BS 7898 (spotlight)". This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written "To evaluate (activity) and report on infrastructures (milestone) necessary to achieve BS 7898 compliance requirements (spotlight)".

6.14 Writing a Title

The title is the name of your project – rather like the name of a novel, something that catches a potential reader's attention but just gives a hint as to what the work is all about. Think of it as a kind of nickname or slogan for your project and as such it is not a good idea to try to use the same set of words for the title, Research Question and aim. Titles typically have two elements:

Aspect – this is the particular focused area of you study

Why – this says why it might be a useful aspect

Mentioning the means by which you solved your problem should only be included in the title if it is crucially important. As an example, suppose your project was concerned with the development of a database and you used Microsoft Access. Unless your project compared your product with a similar database implemented in Oracle, say, then the tool you used to solve the problem is not as important as the problem you set out to solve.

Be careful with titles, there is a tendency to use the title to say what you will do. The purpose of the title is to give a concise name to what you do. Avoid noise words or phrases such as: "A report into..." (redundant: of course it is a report!) or words like "study", "investigation", "enquiry" and "development" are often similarly just noise. It is also usually very unwise to express the title of your project as a question although a title in the form of a proposition is often quite useful as in example 1 below. Here are some examples of good titles:

Planar Similarity – A Possible Software Quality Measure
Heuristics in the Stages of Soft Systems Methodology
A Taxonomy of Heuristic Problem Solving

7. WORKBOOK 7 – BASIC RESEARCH METHODS CHECKLIST

The work book is all about being able to select a research/problem solving method that fits the sort of research study you are engaged in. In every case you will have to decide what data you want to collect and choose rationally a research method (problem solving method if you like) as your primary research vehicle and build a research design around it.

You need to exercise care here so as not to become confused between a Research Method, which is a framework or model for the whole research project such as survey or action research, and Data Collection Protocols, which are vehicles for actually collecting the primary data and might include such things as interview, observation, questionnaire, seminar or role playing. However, before looking at these research models it is useful to just review basic research styles and approaches.

7.1 Research Styles

This is a practical notion and you would be wise to think project ideas through in terms of these styles. There is no sense that one or other is superior and no reason why both should not be applied at the same time.

Quantitative – a style that represents information in numerical form. The numerical form might be graphs and statistics which can be used to show trends, comparison and similarities and the graphs might lead to equations which link variables or allow one to make generalisations.

The advantage of quantitative data is that there is solid evidence that can be permuted in a variety of ways to support or not support a contention. In general, one is counting the frequency of some event – say the number of times the user selects the wrong icon but, and it's a big but, the data is only truly valid in the context in which it was collected so one needs extreme care if we want to generalise.

Qualitative – a style typically used to analyse how certain actions occur not just how often they occur. The information is usually represented in textual form of some kind as a description of some observable event or events. The usefulness of this is that it exposes the thought processes or reasoning behind a particular behaviour – why a user clicked the wrong icon. However, it does make the analysis and representation of the data more complex.

Although these are defined, in practice one does not usually start by thinking about the style and typically as you think about the problem and what primary data your research will collect to deal with it then it tends to define itself as predominantly quantitative or qualitative.

7.2 Research Approaches

There are two broad approaches to research, which is always essentially exploratory. In practice you do not decide the approach as such and it will effectively be decided for you when you formulate your research problem and construct your research design. However, we may loosely define:

Deduction - This means inferring particular instances from a general law. So if for example we use Ohm's law to predict with certainty the value of current if we know the resistance and voltage applied to a circuit. In technology I might want to look at the significance of scripting languages on system development time. I could do this by setting up a null hypothesis that says 'I contend that the use of scripting languages have no effect on system development time' so in effect I am suggesting a law here.

Inductive - This means the inference of a general law from the observations of particular instances. For example, you notice something that happens and see that it happens often. It follows that you can infer a general law from your observations. For example, you notice that people in your company tend to be more productive after IT training so you then make a generalisation using induction and say "training in IT leads to personal productivity increase".

It is very important you understand that nothing has been proved here and all you have is an indication. It is not a proof because we cannot know what new tasks or technologies might occur in the future. One of the greatest modern philosophers, Popper, put it like this. "you can never accurately predict the future because it is impossible for men to know now what they, or others men, will know in the future". It follows that we are never possessed of the data that can allow us to make certain predictions about what may lie over the horizon based on our current stock of knowledge.

In research we might think along either of these lines so for example we often set a hypothesis (a guess at general law) and then try to prove it. Alternatively we can go and collect data and by looking at the data see if we can work out what the law involved might be.

There is no right/wrong approach and it's a matter for you to consider what sort of outlook you are taking although in technology we tend to take an inductive attitude. It may sound simple and often no matter what our stance we end up collecting the same data but it will not always be simple – supposed you were looking at the effects of system migration in a rapidly expanding company and project control methods then it is not obvious what the link between these two things might be so a deductive stance would be unsuitable here.

7.3 Research Outlook

Before we look at the various research methods it is useful just to records that there are two outlooks that are available to a researchers.

Hypothesis Driven – this is the classical research paradigm where we have by some means devised a theory or speculation of some kind and the research is then directed at trying to show that the theory or speculation is valid. For example, we might theorise about who buys Gel Pens and then try to show that it is true, or more usefully try to explain in a report why it is true

Data Driven – it often happens that when we embark on research we don't have a hypothesis which we are setting out to test. This is very common today where corporations have vast databases and want to see if there is anything useful in them that might for example lead to competitive advantage. It follows, that in these cases we don't start with a hypothesis but we examine the data sets looking for patterns or outliers or indeed anything that might allow us to formulate a theory of some kind. For example, we might look through millions of sales transactions and then to hypothesise that people who buy Gel Pens all have beards and wear dark glasses. If this theory is true we can better target our Gel Pen products.

7.4 Which Research/Problem Method to Use?

There are many methods/models that we use for setting up research, the most common being: case studies, vignettes, action research, experiments, surveys, biographies/histories, grounded theory, ethnography and requirements gathering. It is never easy to decide on a method or perhaps more than one method.

Usually in research we do such things as: understand, explore, describe, explain, illustrate, improve, build something or prove something. It is therefore very important when you are trying to decide on a method to keep this basic purpose uppermost in your mind.

Choosing a research/problem method will depend on many factors such as: context, available literature base, basic research purpose, is the domain changing rapidly, time available, skill available, sampling and other practicalities, access, your personal stylistic inclinations, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on. Notice these factors are almost all about practicalities - a design has to be used and that means it has to be practical.

7.5 Rationale: Case Studies

The case study method focuses on just one, two or twenty examples – such as your place of work, or one element of your organization or several aspects of a problem area. Typically:

1. Case studies are commonly used to **illustrate** or **understand** a problem or **indicate** good practice.
2. Case studies always have a context so make sure you are aware of it.
3. Case studies are usually qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain or describe some activity or phenomena.
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. There are broadly speaking two ways to begin case studies. This first is that you can set criteria and then go looking for relevant cases or secondly you can design and create the cases.
7. For most case studies there is usually be a longitudinal element - that is the cases will run over a fixed time period and you will periodically visit each case to collect the data.
8. There are several kinds of case possible:

Unique – implying that the setting and context are extremely rare and there may not be another chance to study this problem area again.

Critical – implies an important theory that you want to test and a particular case fits that profile.

Representative – implies that the case profile represents a typical or everyday situation.

Revelatory – implies that the case profile allows a researcher to study a situation never before looked at in detail and its context may be common.

9. In practice you can use the following to organise your cases but remember once you have your case design you will need permission from whoever is necessary.

How many cases – be practical because there are time limits.

Case Criteria - add as many criteria as you think necessary to pin down the data location but don't have so many that you will never find a case that fits.

Sample criteria (collection protocol) – add as many criteria as you need to pin down a particular sample point where a unit of data can be obtained.

Visit Frequency - each case must be visited to get the data so work this out by looking at how much total time is available for the study.

Data collection Vehicle – by observation, interview, document analysis, etc. You will have to have a protocol to say when a valid sample arrives.

7.6 Rationale: Vignettes

These are perhaps best thought of as micro case studies or snapshots that illustrate just one idea and almost always are qualitative in their application. Typically:

1. Vignettes are commonly used in research contexts where actions, motives and judgements are to be explored, often in sensitive situations and you want to extract and **describe** examples or **illustrations** of significant elements in that problem domain
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain, test an idea or describe some activity or phenomena.
5. Typically you cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept. Therefore, this may also be useful when only a small sample is possible.

7.7 Rationale: Action Research

The main purpose of action research is to improve identified practice in some way. Typically:

1. Action research is commonly used to conduct research at the workplace with a strong desire to **improving** aspects of your own or colleagues' work so
2. In this kind of research you must be in control of events and they must be contemporary.
3. Typically indicated as useful when the research question starts with 'how' and there is a desire to explain something and use that explanation to improve practice.
4. Because of its setting, it is obvious that the research design is linked closely to its context.
5. The whole point of doing action research is the research leads to change in practice.
6. The working strategy is: plan something, do something, observe the something and reflect on what has happened as a result of your actions.

7.8 Rationale: Experiments

This form of research is used where there is a hypothesis and an associated variable that you can control (the independent variable) that will produce a change in some other variable (the dependent variable). That is the whole idea implies that you can intervene by altering or controlling the independent variable. Typically:

1. Experiments are commonly used when you want to **prove** or at least **indicate** that something is true. In practice proof is very difficult as it would imply that you findings are true for everyone, everywhere and for all time and so then tendency is to say indicate rather than prove in most cases.
2. In very simple terms one forms two groups: one which is exposed to the intervention and one which is not and then we observe if there is any difference because of the intervention.
3. Typically indicated when the research question starts with 'how' or 'why'.
4. The researchers must be in control of the events being looked at and they must be contemporary
5. The biggest risk is that there may be other variables involved which we are not aware of.
6. It is difficult to be sure that our sample is representative.

7.9 Rationale: Quasi-Experiments

This form of research is used where there is a hypothesis and associated variables but you cannot control any of them. It would be nice to think we always had time and resources to run a carefully designed experiment but unfortunately this is often not the case. In an experimental design one chooses the samples involved randomly and thus one has control. However, it may be that data already exists and you can test your theory on that existing data or it may be that you simply cannot get control over all the variables that you want. So an experiment and a quasi-experiment are very similar it's just that the quasi-experiment does not quite have all the trappings that a full experiment has.

7.10 Rationale: Surveys

This form of research is used when we want to ask a group of people a question or questions. Typically:

1. Surveys are commonly used when one needs to get and express an overall **understanding** of the properties in a given domain.
2. One could of course also survey 'things' as well as people.
3. Surveys lend themselves to future replication.
4. Typically indicated when the research question starts with 'who', 'what', 'where', 'how' many' and 'how much'
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. Questions must be well-designed and unbiased and may be asked by interview or questionnaire.
7. Be careful to distinguish questions that are asking for facts and questions that are asking for opinion
8. The results will be very dependant on having a big enough and representative sample.
9. Be clear as to how the data will be collected – by observation, interview, questionnaire, etc. You will have to have a protocol to say when a valid sample arrives.

7.11 Rationale: Biographies/History

This form of research is used when we want to trace an historical event and analyses/evaluate its history as this may lead to insights or explain certain action so that lessons may be learned.

1. Biographies/History are commonly used to form a **description** and **explanation** of events.
2. One can use this to look at individuals or organisations or even technology.
3. Typically indicated when the research question starts with 'what'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. Be clear as to how the data will be collected – by documentary study and interviews are common.
7. Histories are naturally chronological and are characterised by epiphanies (pivotal events) and almost always exists in a context.

7.12 Rationale: Grounded Theory

Here the main idea is to use research to arrive at a theory based (grounded) on collected data. Grounded theory is quite difficult to understand and practice.

1. Grounded theory is used in situation where the theory is unclear or even unknown and so there is a need to **explore** seeking **description** and **explanations** in a domain.
2. One can use this to look at organisations or technology.
3. Typically indicated when the research question starts with 'why'.
4. You cannot control the events being looked at but the events need not be contemporary.
5. This is typically a qualitative study.
6. Be clear as to how the data will be collected – by documentary study, interviews, questionnaires etc.
7. Grounded theory is systematic in that the idea is to gradually move closer to a position where we can suggest a theory or proposition.
8. The basic unit of research is the category which is something that may represent a unit of information and might be almost anything.
9. The essence of grounded theory is in its data processing where various forms of coding are used to gradually unlock meaning in the data.

Open Coding – essentially the formation of the initial categories of information – it is characterised by looking for properties or asking when the something is a dimension of the research space.

Axial Coding – this is about trying to assemble that data after open coding. This can be done by using a diagram or some logic that connects things or looking for causes or looking for contexts and consequences.

Selective Coding – here the researchers invents a plausible storyline that integrates the categories in the axial coding model.

Matrix – a final step (though often omitted) is to produce a conditional matrix that is supposed to make clear the social, historical, technological or economic conditions that prevail in a situation.

Theory – one hopes that as a result of all this processing a theory will emerge which of course may go on to be tested by a formal experiment.

7.13 Rationale: Ethnography

This form of research is used when to immerse ourselves in the day to day life of an organisation or group. In this context ethnography is a description and interpretation of a cultural or social group.

1. Ethnography is commonly used when we want a reflective **description** expressed in an **interpretive** manner.
2. One can use this to look at individuals but more typically organisations.
3. Typically indicated when the research question starts with 'why'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. You may alter the events being looked at because you are normally a participant observer.
7. Be clear as to how the data will be collected – by participant observation.
8. Ethnography is about immersion in a culture: behaviours, language, structures and functions.
9. In such studies one often encounters gatekeepers, key informants and communication relies on a sense of reciprocity by investigator and his subjects.

7.14 Rationale: Requirements Gathering

Requirements are simply a statement of a systems service (what it must do) or constraints (what it does not necessarily do). In practice saying what a system must do is often extended to how it will do it. This method is a form of action research but it differs in that the only contact one has with the people involved is at the requirements stage and possibly at the implementation stage though this may vary depending on the systems life cycle employed. You should use this method when you are setting out to build an application of some kind such as a computer application. There are 4 stages of requirements.

Functional Requirements - These are requirements that say what a system does or is expected to do. Typically this would involve or include most of the following: process descriptions, details of all inputs/outputs and details of all the data that must be held in the system.

Performance Requirements - This is usually understood to mean requirements that describe aspects of the system that are concerned with how well it provides the main functional requirements. For example: performance criteria such as response times or how long it takes to print a report, data throughput and storage needs and security considerations.

Technical Requirements - This aspect of requirement looks at the tools and method used to build the system. For example, it may happen that you have to use a certain database package or for other reasons you need to select a particular scripting language and so on. More often than not this aspect amounts to looking at technical constraints that must be applied in building the system.

Usability Requirements - Requirements that ensure that there is a good match between the system and its users. In most cases usability is expressed in terms of measurable objectives.

7.14.1 The Requirements Document

The system and software requirements are usually documented in a formal manner so that ones understanding may be communicated to customers and system builders. The requirement document describes the following:

Services and Function – that the final system must deliver.

Operational Constraints - under which the system must operate.

Development Constraints - on the process used to develop the system.

Properties of the system - in the sense that it may have unplanned additional functionality.

Links - definition of other systems with which the system must integrate.

Domain - Information about the application - for example how to carry out certain tasks.

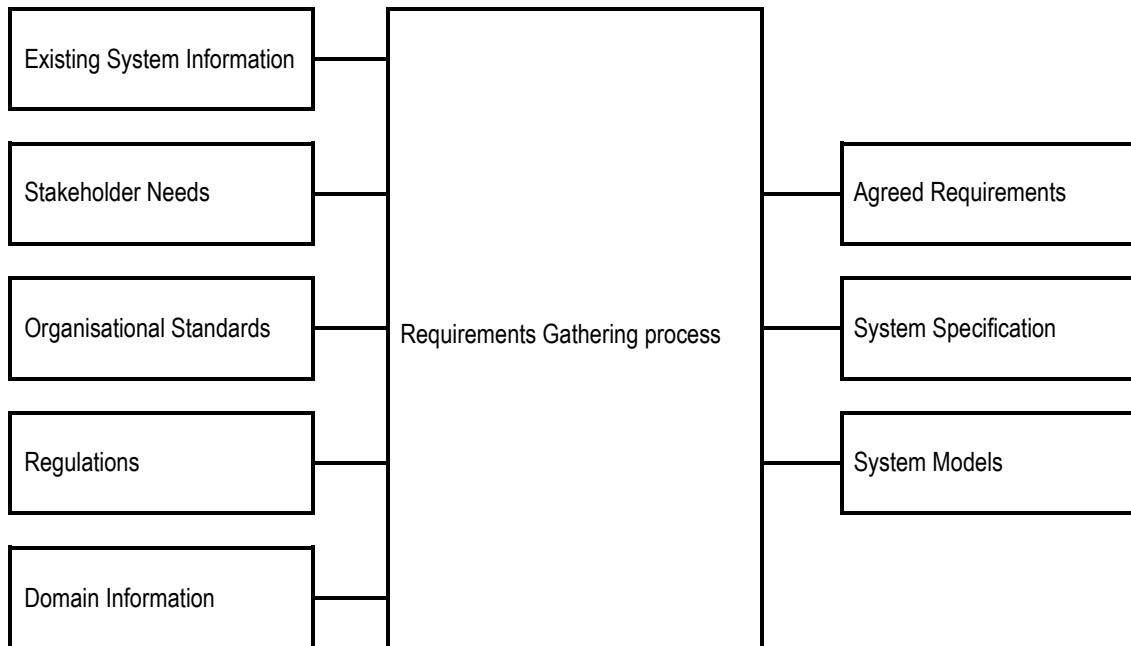
Definitions – acronyms, abbreviations etc.

7.14.2 Stakeholders

These are people who will be affected by the system and therefore should have a direct or indirect influence on the system requirements.

7.14.3 A Process Model

As a process model we might define the requirement process as follows.



7.14.4 Requirement General Questions

There are perhaps four general questions we might ask when attempting to gather requirements

Problem - What are the problems with the current processes?

Improvements - What are the improvement goals?

Reference. Kotonya, G. and Sommerville, I, (1997), Requirement Engineering, Wiley, ISBN 0-471-97208-8. This book is useful because it also contains excellent reading and reference lists.

7.15 Research Design

Finally, you must set out your research design. That is, explain how you will get your data – and this must be done in great detail. In summary, then, your research design is the blueprint of your research project which enables you to deal, systematically, with:

What questions to study?

What data is relevant?

What data to collect – you will need to work very hard here so that you can rely on your data.

Are there any practical limitations to what you can do

How to analyse the results – don't shirk this.

How to decide in which contexts your findings are applicable or can be exploited.

The main purpose of your research design is to help you avoid a situation in which the evidence you eventually collect does not address your initial question.

7.16 Research Process Development

It is quite common is many kinds of research but notably in Case Study and Action Research for the researcher's perceptions to change as data emerges. Often this will imply that the research design has to be changed or amended if it is to remain meaningful. These changes may be small such as a slight modification to the Research Question or aim but occasionally it may be necessary to make significant changes. For this reason researchers must always be careful in their design to allow a little flexibility if they can to accommodate possible unforeseen circumstances.

8. WORKBOOK 8 - BIBLIOGRAPHIC REFERENCING HARVARD APA

This workbook is a short summary of the APA style guidelines as contained in The Publication Manual of the American Psychological Association, 5e, 2001 (Subject Reference Collection: 808.02 AME).

The APA style is based on the Harvard referencing system whereby the date of publication follows the author name(s), and in-text references refer to items in the reference list using the author surname and date of publication, in brackets.

Referencing is important in all academic work as it indicates to the reader the sources of your quotations and borrowed ideas. Failure to indicate your sources is tantamount to plagiarism (literary theft). The purpose of the referencing system is to describe your sources in an accurate and consistent manner and to indicate within the text of your paper where particular sources were used.

Please note that there are two sections to this document:

How to **reference** correctly a source in the **bibliographic** section of your work

How to **cite** correctly a source in the **written** part of your work

Don't Get Caught Out! If you do not reference correctly you may lose marks or your work may be returned unmarked to you for correction. Therefore:

Keep a careful note of all sources used as you prepare your assignments.

Record all the details you need about a library book (including page numbers for any quotations) **before** you return it - someone else may have the book if you try to go back and check later.

Make sure you write down the source details you need on any photocopies or downloads you make.

Remember to print or save details of any website you want to refer to and record the date when you accessed the information.

8.1 Reference list (Bibliography) at end of Project/Dissertation

The reference list should be arranged alphabetically by author surname. The APA format requires book and journal titles etc. to be italicised, although we are not strict about that.

As a rule in projects and dissertations it is normal to produce two lists. The first is a reference list and that **MUST** only include sources you have cited. The second is a bibliographic list which includes all other sources you might have found but did not cite – this list is to allow the reader to explore the topic further if they wish.

8.2 Books

The details needed for a book can normally be found on the front and back of the title page. Make sure you locate the name of the publisher rather than the printer or typesetter. You need the name of the publisher in your reference list. Ignore any reprint dates; you need the date when the first, second, third edition etc. of the book was published according to which edition of the book you are using.

8.3 Journal articles

The details needed for a journal article can usually be found on the contents list, front cover or article itself.

8.4 Printed publications: Examples of References

The following are sample if how to correctly reference a source.

Book – pattern: Author, Initials. (year). Title of book. Place of publication: Publisher.

American Psychological Association. (1994). Publication manual of the American Psychological Association 4e. Washington, D.C.: Author.

Encyclopedia of psychology. (1976). London: Routledge.

Gardner, H. (1973). The arts and human development. New York: Wiley.

Moore, M. H., Estrich, S., McGillis, D., & Spelman, W. (1984). Dangerous offenders: the elusive target of justice. Cambridge: Harvard University Press.

Strunk, W., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

Note: Only list up to 6 authors. The 7th and subsequent authors are abbreviated to et al.

Edited book

Maher, B. A. (Ed.). (1964-1972). *Progress in experimental personality research* (6 vols.). New York: Academic Press

Article in edited book (Chapter) - The basic pattern for a reference to a chapter in an edited book (where the chapters have been written by several different people) is:

Author of chapter, Initials. (year). Title of chapter. In Initials. Name of Editor/s (Ed.) *Title of book* (pp.start and end page numbers of chapter). Place of publication: Publisher.

Vygotsky, L. S. (1991). Genesis of the higher mental functions. In P. Light, S. Sheldon, & M. Woodhead (Eds.), *Learning to think* (pp. 32-41). London: Routledge.

Encyclopedia entry - If the entry has no author, begin the reference with the entry title followed by the date of publication.

Lijphart, A. (1995). Electoral systems. In *The encyclopaedia of democracy* (Vol. 2, pp. 412-422). London: Routledge.

Government publication

Great Britain. Command Papers. (1991). *Health of the nation* (Cm 1523). London: HMSO.
Great Britain. Home Office. (1994). *Prisons policy for England and Wales*. London: HMSO.

Report

Birney, A. J., & Hall, M. M. (1981). *Early identification of children with written language difficulties* (Report No. 81-502). Washington DC: National Educational Association.

Conference paper in published proceedings

Borgman, C. L., Bower, J., & Krieger, D. (1989). From hands-on science to hands-on information retrieval. In J. Katzer, & G. B. Newby (Eds.), *Proceedings of the 52nd ASIS annual meeting: Vol. 26. Managing information and technology* (pp. 96-100). Medford, NJ: Learned Information.

Journal article - The basic pattern for a reference to a journal article is:

Author, Initials. (year) Title of article. *Title of journal*, Volume number - if there is one (Issue number), start and end page numbers of article.

Noguchi, T., Kitawaki, J., Tamura, T., Kim, T., Kanno, H., Yamamoto, T., et al. H. (1993). Relationship between aromatase activity and steroid receptor levels in ovarian tumors from postmenopausal women. *Journal of Steroid Biochemistry and Molecular Biology*, 44(4-6), 657-660.

Popper, S. E., & McCloskey, K. (1993). Individual differences and subgroups within populations: the shopping bag approach. *Aviation Space and Environmental Medicine*, 64(1), 74-77.

Weekly magazine article

Barrett, L. (2001, August 23). Daewoo's drive to survive in the UK. *Marketing Week*, 22-23.

Newspaper article

Caffeine linked to mental illness. (1991, July 13). *New York Times*, pp. B13, B15.
Young, H. (1996, July 25). Battle of snakes and ladders. *The Guardian*, p. 15.

Two or more works by the same author(s) with the same publication date - Where an author (or particular group of authors) has more than one work in a particular year, list them in title order and follow the date with a lower case letter a, b, c, ... For example:

Harding, S. (1986a). The instability of the analytical categories of feminist theory. *Signs*, 11(4), 645-64.
Harding, S. (1986b). *The science question in feminism*. Ithaca: Cornell University Press.

Anonymous works - If a work is signed "Anonymous", your reference must begin with the word Anonymous, followed by date etc. as normal. If no author is shown, put the title in the normal author position.

Note on source page numbers - Use pp. for page range only for encyclopedia entries, multi-page newspaper articles and chapters or articles in edited books. For articles in journals or magazines use the numbers alone.

Interviews and email messages - Because interviews and email messages are not considered recoverable data, you do not give details in your reference list. You should, however, cite an interview or email message within the body of your text as a personal communication: ...and this point was conceded (J. Bloggs, personal communication, August 22, 2001)

Legal References - Because the situation regarding legal references is complex and only US law is covered in the APA Manual, legal references will be covered in a separate guide.

Audiovisual sources: examples of references - Such sources are often complex but please note.

Films - The basic pattern for a reference to a film is:

Name of primary contributor - the director or producer, or both, Initials. (Role of primary contributor). (year). *Title of film* [Motion picture]. Country of origin - where the film was primarily made and released: Name of studio.

Reed, C. (Director). (1949). *The Third Man* [Motion picture]. United Kingdom: British Lion/London Films.

Spielberg, S. (Director). (1993). *Jurassic Park* [Motion picture]. United States: Universal Pictures/Amblin Entertainment.

If the film doesn't appear on the Library Catalogue, the Internet Movie Database <http://uk.imdb.com/> is a good place to check all the details needed for a film reference (follow the Company credits link to find details about the film studio/s involved). Alternatively, check Halliwell's Film and Video Guide.

Review of a film - If the review is untitled, put everything in square brackets in the normal title position and keep the square brackets.

Kinder, M. (2002). Moulin Rouge [Review of the motion picture *Moulin Rouge*]. *Film Quarterly*, 55(3), 52-59.

Malausa, V. (2001). Beauté du mensonge [Review of the motion picture *The Tailor of Panama*]. *Cahiers du Cinéma*, 558, 82-83.

Television programmes

Collinson-Jones, C. (Producer), & Dobson, E. (Director). (2003, July 14). Casualties of peace [Television broadcast]. London: Channel 4.

Single episode from a television series

This example shows the most complete information possible for a television episode. If details of the writer are unavailable, begin your reference with the name of the director.

Fraser, R. (Writer), & Geoghegan, S. (Director). (2003). Eyes wide open [Television series episode]. In P. Goodman (Producer), *Holby City*. London: BBC1.

Radio programmes

Portenier, G. (Producer). (2003, July 17). *Crossing continents*. London: BBC Radio 4.

Electronic sources: examples of references - The details shown below have been compiled according to the guidelines available on the APA Website (<http://www.apastyle.org>) in August/September 2001 (re-checked July 2003). Check this Website and the 5th edition of *The Publication Manual of the American Psychological Association* which is available in the Frewen Library for further guidance.

The basic pattern for a reference to an electronic source is:

Author, Initials. (year). *Title*. Retrieved month, day, year, from Internet address.
Banks, I. (n.d.). *The NHS Direct healthcare guide*. Retrieved August 29, 2001, from <http://www.healthcareguide.nhsdirect.nhs.uk/>

If no date is shown on the document, use n.d.

If the author is not given, begin your reference with the title of the document.

If a document is part of a large site such as that for a university or government department, give the name of the parent organisation and the relevant department before the Web address:

Alexander, J., & Tate, M. A. (2001). *Evaluating web resources*. Retrieved August 21, 2001, from Widener University, Wolfgram Memorial Library Web site: <http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm>

Deciding your future. (2000). Retrieved September 5, 2001, from University of Portsmouth, Careers Service Web site: <http://www.port.ac.uk/departments/careers/plancareer/deciding-your-future.htm>

Electronic journal articles which are duplicates of the printed version - Use the same reference format as for a printed journal article but add "Electronic version" in square brackets after the article title:

Lussier, R. N., & Pfeifer, S. (2001). A crossnational prediction model for business success [Electronic version]. *Journal of Common Market Studies*, 39(3), 228-239.

If you are referencing an online article where the format differs from the printed version or which includes additional data or commentaries, you should add the date you retrieved the document and the Web address (URL).

Articles in Internet-only journals

Korda, L. (2001, July). The making of a translator. *Translation Journal*, 5(3). Retrieved August 21, 2001 from <http://accurapid.com/journal/17prof.htm>

Use the complete publication date shown on the article.

Note that page numbers are not given.

Whenever possible, the URL you give should link directly to the article itself.

Break a URL that goes onto another line after a slash or before a full-stop. Do not insert a hyphen at the break.

Articles retrieved from a database - Use the format appropriate to the type of work retrieved and add a retrieval date, plus the name of the database:

McVeigh, T. (2000, July 9). How your gestures can do the talking. *The Observer*, p.7. Retrieved September 10, 2001, from The Guardian and The Observer on CD-ROM database.

8.5 Citing references in the Text

There are basically two forms. The first is when the author's name is naturally part of the sentence and the second when it is just a reference. References are made from the text of the paper to the full details of the work in the reference list in the following manner:

It is a contention of the paper, and this contention is supported by Williams (1995, p.45) who compared personality disorders ...

When an author, or group of authors, has more than one publication in the same year a lower case letter is added to the date. For example:

In two recent works Harding (1986a, p.80; 1986b, p.138) has suggested that ...

With two authors both names should be listed in each citation e.g. Duncan & Goddard, (2003, p.99)

With three to five authors name all authors the first time, then use et al. (and others). For example: the first time it would be Moore, Estrich, McGillis & Spelman (1984, p.33) and subsequent references to the same publication would use Moore et al.

For six or more authors, use et al. after the first author in all occurrences.

Note that when the in-text reference occurs naturally within the sentence "and" should be used before the final author.

When a source has no author, cite the first two or three words of the title followed by the year. For example:

... in the recent book (*Encyclopaedia of psychology*, 1991, p.62) ...

... in this article ("Individual differences," 1993, p.12) ...

Web pages where no author is given

However, if the author is designated as "Anonymous", cite the word Anonymous in your text e.g. (Anonymous, 1993, p.116).

When using quotations in your text

Try to observe the following methods.

Gardner (1973, p41) stated that, "The relative importance of the systems may nevertheless remain in approximately the same proportion"

Smith (1991, p84) found that "...there is no evidence that chimpanzees can produce a drawing and discern the object represented in it..."

Occasionally, very occasionally you may need to cite a work that you discovered in another work because you cannot find the source then observe the following examples:

Smith (1970, p.27) cites Brown (1967) as finding ...
Brown (1967), cited by Smith (1970, p.27), found ...
It was found (Brown, 1967, cited by Smith, 1970, p.27) that ...

If you need to use this form your tutors must approve it and you must show that you have made every effort to track down the primary source.

9. WORKBOOK 9 – WRITING UP A RESEARCH PROJECT

This workbook is in several sections covering everything from project supervision to grading.

9.1 Your and Your Supervisor

The student supervisor relationship is very important if a high quality project is to be achieved. As a rule the supervisor will be interested in the topic area and will want to be active in its development although you as a student must do the work. However, your supervisor will not be expert in everything but will usually have some knowledge of simple statistics and the four main research methods: experiments, action research, surveys, case studies and application development.

9.1.1 Student Expectations

The normal expectation is that students have of their supervisor are as follows:

- Only be available for consultation for a limited time.
- Only supervise what the student does and not do the work for them.
- Advise on research design, scheduling and literature surveys.
- Advise on theoretical, conceptual and methodological issues.
- Advise on development of research skills.
- Advise on data collection, processing and analysis.
- Advise on ethical issues if they are relevant.
- Read, evaluate and be constructively critical of student work if given sufficient time.
- Have a good knowledge of the general area you are working in.
- Be in contact with the student regularly.
- Arrange if necessary supervision chat sessions.

For project students on distance learning programmes it will be possible to have meetings in the WebCT chat room, using IM or Skype where a full and detailed interaction can take place. These must normally be agreed with your supervisor and must be planned not to clash with other classes. However, some tutors may allow student to contact them any time they are seen to be online.

9.1.2 Departmental Expectations

Supervisors take a formal role and certain attitudes and actions are expected. In general they will:

- Visit the discussion board and email regularly within WebCT (at least 3 times per week).
- Set a mail forwarding address to their personal accounts in WebCT email settings.
- Devote at least 6 hours to the supervision process spread over the project duration.
- Conduct one-to-one chats as required with project students.
- Conduct student/supervisor communication within WebCT or their personal email account.
- Respond to a student query within a certain time frame (normally no longer than 3 days).
- Be familiar with all the project guidance notes and workbooks.
- Be familiar with the project chapter profiles.
- Make sure students know if they are to be away for an extended period.
- Be aware that students may make contact through any one of several WebCT accounts.

The essence of online supervision adequacy is based on the quality of communication between supervisor and student with the intent that we want the learning experiences to be exciting, stimulating and self-rewarding. In practice this means that communication must be frequent, lucid, critical and yet encouraging.

Supervisors should be aware that if they set email forwarding in WebCT they will effectively get an automatic alert when there is mail for them. If the student has also set mail forwarding then supervisors will be able to reply immediately otherwise they will have to go into WebCT. However, there is no alerting mechanism if a student posts a question into discussion so supervisors must visit the site from time to time so as not to miss any messages.

9.1.3 Supervisor Work Reviews

Supervisors will read your written work. However, when they do this certain rules apply:

Finished work – you should supply your supervisor with written work as it is produced chapter by chapter but it must be finished work. In this context finished work means that the format and content are the very best you can produce and in accordance to the guidelines found in this workbook. The tutor's role is not to act as some kind of filter for rough work or polishing multiple drafts which you want to improve in effect making them do the work for you. If a tutor suspects that the section you have sent in is not in its final form they will return it to you without comment.

Action on Feedback – if you are given feedback on any part of your work then you are expected to study it with care and commitment. However, it is up to you how to respond or even ignore what you are told but in all cases the consequences that follow are entirely your own responsibility.

Responding to Feedback – in all cases you are expected to respond to feedback. This may take several forms: writing to your supervisor saying that you don't agree with him or perhaps offering further explanation or as in most cases making changes to the content or structure of your project document. When you make document changes in response to feedback they are to be shown **shaded** so your supervisor can easily see exactly what you have added or amended.

Questions to Tutor - your tutor will not answer any questions regarding whether your work is right, wrong, is it a pass, what mark will I get or is it good enough. The only thing you can expect in this area is that you tutor may advise you that the work is not ready for submission to the university. If this happens it will be entirely your own decision whether to submit or not but if you do not submit a fail will automatically be recorded and you should be aware that extensions will not normally be given.

Response from Tutor - in most cases your supervisor will only suggest that you do something or ask a question designed to point you in a new direction. Normally, the tutor will not supply you with any project content since that must be provided entirely by you. The reason is that the work is yours not the supervisors.

Preparation - Your supervisor will expect you to be familiar with all the notes and workbooks contents. You should therefore be careful that you don't waste supervision time asking questions to which you already have the answers.

9.1.4 Chat Session

Chat sessions for project students will usually be one-to-one and typically used when there are particularly awkward difficulties – chat will NOT be the norm during projects and your tutor will have no expectation that chat will be used.

9.2 Overview of Project Structure

Here are some general guidance notes – they are NOT suggested chapters but general content guidance on the project as a whole and have a sharp process focus.

9.2.1 Introduction summary

This is about the problem theme and its setting, target, client context, topic area, personal theory, Research Question or application functional description and intended project outcome, general research orientation followed by a well-defined aim and sound set of objectives. The introduction is to be precise but concise taking a discussion form that is explanatory and focused on giving readers a clear, coherent and comprehensive view of what the project is about.

9.2.2 Preparation for Research

This is your study of the topic area and research methods that you will need to know about. You will have to justify and explain the methods you intend to use; it is also your study of other people's work in the area that you wish to investigate - and a description of how you learned from their research.

Literature Review - What has been done before in this area - related to a particular problem theme and your Research Question? This is all about preparing one's mind with all the topic area and research knowledge you will need.

Research Review - research into how the project investigation could be done and supported. At this stage student will already have an outline plan based on their approved specification but now the whole design must be thoroughly reviewed before actual work begins.

Knowledge of Alternatives – build a simple decision base which allows one to consider which methods could be used and how could they be used for this project.

Choices Made - which methods are to be used and rationally consider why they are good enough for the purpose.

9.2.3 Core Research

Here you execute the refined research design translated into a practical plan to obtain the collection of primary data and process it using acceptable methods into the intended project outcome.

9.2.4 Evaluation and Conclusions

This is the stage that looks at how one finishes off a project by a process of evaluation and the drawing of conclusions. In particular, it is needful to look at how one evaluates what was done and how it was done – that is, one needs to consider the project product (or outcome) and the project practice. For our purposes evaluating will be taken to mean reflecting on product and practice.

Many students confuse evaluation and conclusions but for a full consideration of the research work one must look at all project specific evaluation of results and outcomes as well as practices and then perform the more difficult step of drawing generalised conclusion about both product and practice.

Evaluation of Project Product – the specific project outcome or product is normally evaluated against objectives, other existing products, using defined criteria or some form of expert evaluation. Additionally, one needs to be aware of any constraints that might have an impact on the applicability of the outcome. However, typically one asks about the outcome (product): has it any value, who will use it, what will they use it for, will it get you your target effects that sort of thing.

Evaluation of Project Practice - evaluation of specific project practice is more difficult than evaluation of project outcome (product) and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking 'how well did I do it', 'was it successful' and 'should I on reflection have done it another way', 'did I make any mistakes', 'were there any surprises', "have I discovered any principles" and indeed did you learn anything. Additionally, one needs to be aware of any constraints involved, including time management that might have impacted on the use of best possible practices.

Conclusions – here we are trying to go beyond the obvious project findings and so we need to consider thoughtfully implications and meaning that arise out of an attempt to generalise about the topic based on your findings/outcome - that is you might have set your project in the Caribbean but do any of the findings have wider implications, are there general lessons to be learned, have you uncovered a principle or is there any sign of a best practice here that kind of thing.

9.3 Writing up your Project

The following sections describe elements that occur in almost all projects and which are generally important in constructing scholarly work. Do not be tempted to ignore these instructions – anyone who departs from the spirit of them may have their work returned for correction prior to formal marking.

9.3.1 Main Project Body Page Layout

The following shows how each page of a project report should look, note that each chapter starts on a new page and that it is NOT necessary to actually say Chapter 1, Chapter 2 and so on as it is the heading that is important. Do not use numbering to greater than three levels but you may use indented (but not bulleted ones) entries within a section at any level.

1. QUALITY CONTROL IN PROGRAM DEVELOPMENT

In this chapter the nature of quality will be discussed and its relation to physical measurable properties that might characterise quality.

1.1 INTRODUCTION

This project discusses a possible strategy for devising a program development methodology that goes some way to guaranteeing the qualities of the program code of delivered system. In particular it will concentrate on just two aspects - that of developing generic designs and code and how such designs could be assessed for quality and function. The strategy is based on the simple premise as endorsed by leading authors in the field such as Wilson and Bowers that categories of problem can be identified and formalised. It is the contention of this report that such a process would more or less automatically:

Reduce - the complexity of the design process itself.

Ensure - the quality of the final product by:

Giving managers more control over the product development cycle.

Giving users more idea of the kind of system they are likely to get and much more say in what the shape of the product will finally be.

Releasing programmers from the drudgery of having to design the same piece of code over and over again, thus enabling them to concentrate their efforts on new

1.2. Multiplicity of Design Factors

Every programmer has had the difficult experience of having to read and understand programs written by someone other than himself or herself. The sort of problem encountered may be aptly expressed in the following lines.

Everything has been thought of before, but the problem is to think of it again. (Goethe)

Many other authors, notably Frewin (1989) have discussed the notion of 'quality model ratios' and in essence this idea means that software systems have an implied model which can be accessed for

1.2.1 Multi-Tier Systems

In modern client sever systems

1.2.2 Interface Facades

In this case we look closely at the Internetetc

9.3.2 Plagiarism Checking

A software tool will check all your sources automatically and if plagiarism is identified it will be dealt with very seriously since the reputation of the whole course and of the University is at stake. You must remember, that copying, paraphrasing, summarising and similar techniques where the material is extracted from a source must be properly acknowledged. A simple rule is that if you use more than 6 consecutive words from a source it must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

9.3.3 Writing Abstracts and Identifying Keywords

The function of an abstract is to summarise your project, its context and its conclusions in order to give the reader an overview of the main project theme so that they can make an informed decision on whether they want to read the entire report. A good basic structure might be defined as follows but it will usually be limited to around 300 words.

What was the project about?

What did you actually do?

What were the conclusions/outcomes?

It is normal to add keywords or phrases after the abstract to act as specific pointers to content. There are no particular rules about how to construct these words or indeed how many there should be but typically there are 5 or 6 and to be useful they must be chosen with care in the sense that they might in themselves be regarded as a sort of abstract of ones work.

9.3.4 Standard Appendices

Project reports MUST include at least the following appendices:

Project specification and project Plan – it may be brought up to date from that submitted at the start

A glossary if this is appropriate

A full reference list of work that you cited

A bibliography (may be combined with your citation list)

Each Appendix should be introduced by a title where the number (12 in this case) should follow on from the numbering within the body of the report: **12. Appendix A – Project Specification.**

9.3.5 Typical Project Organisation

Below is a suggested organisation for your complete project.

Briefing Pages

Heading pages (examples follow later in the section)

Plagiarism declaration

Abstract for Report including keywords

Acknowledgements

Dedications

Content list (automatically generated) for all headings, tables and figures/graphs etc

Introduction:

Brief topic area outline and background to problem
Presenting Problem definition
Real World Target relevant to the problem
Speculation of problem causes/symptoms and possible solution routes
Personal Theory on the best solution route leading to a named outcome and actor
Research Question/Application Description
Scope and scale of work
Aim and Objectives

Literature Research (see Workbook 5 for recommendation for various project styles)
Detailed consideration of elements that help you focus on your topic area

Research Design

Research Method and its selection rationale in dealing with the research question/application
Process to collect Primary Data
Process definition to get from Primary Data to get an outcome

Application Testing (Engineering project only)

Design of Tests
Test Results and conclusions to be drawn from testing.
Implementation plans

Results Discussion and Presentation (study projects only)

Discussion and presentation of primary data
Generation of intended project outcome

Evaluation (this is specific to what you did)

Detailed evaluation of what was actually done – your practice
Detailed evaluation of your project product/outcome including objectives not met
Met/Not met objectives

Conclusions (here one tries to generalise what was done)

Main generalisations based on a consideration of both product and practice
It is also possible to examine the following minor conclusion elements but if this is all you produce the mark allocated will be very low.

- Usefulness of literature sources
- Future work/development
- Relevant aspect of the course used during the project period
- Changes one would make if project were repeated
- What you have learned
- Value-added features

References and bibliography (see workbook 5)**Content of Appendices**

The following items must be in a set of Appendices. These may be bound separately if the composite document becomes too large (more than 100 pages).

- Code listings
- Project Specification and project schedule
- Inclusions (copies of relevant documents such as policies, invoice layouts, diagrams etc)
- Questionnaires.
- Summary interview transcripts
- Details test plans
- Requirement catalogues
- Glossary
- Other

9.3.6 Project Types Sample Outline Contents

Broadly speaking there are two kinds of project: engineering where you build an application of some kind and study based where one would investigate in depth some idea. Here are some sample contents lists that show chapter or section headings for the different project styles. However, if it is obvious that these samples have just been copied into your project with minor changes then your work will be rejected. See Workbook 9 section 9.3.5 for further general details.

Sample Study Style Report Contents	Sample Engineering Report Contents
Title: Internet Marketing – A Users View	Title: BrokerBase – Insurance Sellers Information System
Chapter 1. Introduction to Internet Marketing	Chapter 1. Introduction to System
Introduction and contextualisation IT marketing problem theme Problem Theme, Target and Outcome Discussion and Exploration of Research Question Project aim and objectives	Introduction and Situation Overview Situation based Presenting Problem Application background and context Application overview Project aim and objectives
Chapter 2. Literature Review	Chapter 2. Literature Review and Application Scenario
Introduction to Internet Marketing Marketing Planning eCommerce Technologies and Tools Costs and Benefit Estimation Consumer Orientation and Market led operations IT supported Marketing and selling techniques Product, Price, Place, Promotion and Customer expectation IT supported Experiential marketing Security protocols and languages Auditing and secure payment systems	Outline of Insurance Brokerage practice Background Review of the Application Scenario Outline of Application Build Process and Tools
Chapter 3. Research Design	Chapter 3. Requirements Specification
Research Method Selection and Rationale Primary data collection process Data specification Data locations and expectations Collection Protocol Processing of Primary Data Collection Outline Results Project Outcome	Outline of the requirements (requirement catalogue into appendix) Research Plan for requirement gathering: functional, performance, technical and usability Outline Requirements catalogue Analysis and Evaluation of requirements
Chapter 4. Evaluation (Project Specific)	Chapter 4. System or Application Design
Evaluation of Project Outcome Evaluation of Research Methods and Protocols used	Principles used for this design Overall system design Build Process Overview Database design Component design Interface design including website
Chapter 5. Conclusions (Project Generalisations)	Chapter 5. System Implementation and Testing
Generalisations on the research Outcome Reflections on what was learned etc	Testing strategy Testing plans (detailed plan placed in appendices) Test results (detailed report placed in appendices) Application Implementation plans
	Chapter 6. Evaluation
	Evaluation of the application Evaluation of practice (methods and tools used)
	Chapter 7. Conclusions
	Generalisations based on the Application Reflections on what was learned Future work Etc
Notes	
1. Whatever the project styles the appendix must include: the project specification, glossaries, references lists, bibliographies. The appendices may be attached to the main report or they may be placed in a separate document.	
2. Remember these are just samples and you may well have different numbers of chapters and different heading and sub-headings	
Table 4. Sample Project Content Outlines	

9.4 Report Writing

In your research generally you will often have to write reports and of course you will have your final project report to write. Reports are a special form of writing and therefore you need to note that reports are:

- Written for defined purpose and targeted at a specific audience.
- Written systematically to present your of findings and outcome.
- Focused on what you have done.
- Information structured and formatted to lead reader quickly to main themes, findings and outcome

9.4.1 Structural Elements

It is important to structure all your work in a way that enhances its usefulness and utility. The following is a list of all the major structural elements, though there is no need to use all of them in every document you produce. The best advice is to choose a structure and then those elements that best suit the work in hand.

Structure	Description	Location
Title	A focused and short description of the document that summarises the deliverable element	Front page and above the contents list
Contents List	A short index based on the major chapters and/or sections	Before the main document begins but after the title page
Glossary	Used to list and describe special terms or abbreviations	Towards the end of the main document
Index	A detailed listing of all important words or phrases specifying location in main text	After the glossary if it exists otherwise after the main document
Appendix	For inclusion of explanatory notes, special documents or copies of originals	After the glossary but before the index
Footnotes	Notes at the bottom of pages and linked to pieces of text.	Immediately before the page footers
Headers	Standard text	Every page
Footers	Standard text	Every page
Keywords	Words or phases used to form a simple classification of your work	Near front of report
References	List of all reference material in an approved manner	Toward end of document
Table 5. Main Document Physical Structural Entities		

Organisation	Description
Chapters	Major elements in the development of the subject matter of the document
Sections	Minor elements in development of each chapter
Headings	Major Information Content indicators
Indents	Used to emphasise small but important points in the text
Bullets	Used to further emphasise an indented text
Tables	Used to represent important information concisely
Paragraph numbers	Used when it is necessary to reference all parts of a text
Page numbers	Used for indexing purposes
Diagrams	Used to show idea or data pictorially
Captions/Legends	Added to diagrams where necessary
Columns	Use when the subject material lends itself to such a view
Table 6. Main Document Structural Devices	

Presentation	Description	Examples
Font	Letter style and size	May be proportional or fixed point
Renditions	Printed form of font	Bold, underline, italic, reversed
Orientation	Page format	Portrait or landscape
Form	Delivery form	Paper, electronic
Table 7. Main Document Structural Properties		

9.4.2 Report Writing Stages

There are a number of stages to writing a report and they require you to be focused on what you are trying to say at the core of your report.

What are your trying to show – this really goes along with the underlying purpose of your research question – typically this will be about wanting: to inform, to explain, to evaluate, to prove, to advise, to recommend, to predict or to bring about changes.

Collect and sift material – it is important to jot down ideas relevant to your purpose. These jottings will help you form an action plan for gathering information from other documents, visits, interviews, observation, surveys etc.

Note – the exact location of information sources as you find them using Harvard APA format

Organise and structure the material - group your work into chapters, sections, sub sections, tables, appendices and so on and ensure their presentation order is logical.

Draft and edit/redraft – to get a good report you may well have to re-write it several times and this may include complete re-ordering. It is important that you need to be concise and use a formal language but it must be clear and concise. Use simple, straightforward words and sentence construction and make sure your spelling and grammar are faultless. Use clear headings and sub headings with bulleted indentations.

Thematic – make sure your work has clear themes that are easy to follow.

Plain English - do not try to be over-clever or fall into jargon.

Read Saunders chapter 13 pages 414 to 443. Don't skim on this or I might skim when I mark inferior work!

9.5 Project Submission Regulations

Successful project reports may be lodged in the University library, it is therefore important that reports follow a standard binding format as described below. Project reports that deviate from these regulations may be penalised and returned to you for correction and in extreme cases, failed.

Submission - two full bound A4 portrait orientation copies of your report must be submitted by the due dates. The report may NOT be submitted electronically – the copies must be sent by courier to reach us by the defined dates. However, you must also submit soft copies on either floppy disc or CD/DVD.

Presentation and Submission Checklist – your project report must be submitted using the correct form shown in Workbook 10. The form must be bound into your project.

Report Length - the maximum permitted report length is 15,000 words, which usually translates into around 50 to 100 pages (excluding appendices). If your report is likely to be significantly longer than this, consult your supervisor as to what to include and what to exclude. You are warned that should you exceed the permitted maximum length the University may return your work unmarked.

Binding - the project and any separate appendices should be securely bound using tape or book binding - if that is not available then plastic ring binding may be used. No other form of binding is permitted. Binding covers should be a card of weight of 140 gsm and the normal colour is to be RED but any other colour may be used in case of sourcing difficulties

Front Covers Format - the front cover appropriately spaced vertically should conform to the pattern shown below using 24-point Arial Narrow with centred text and bold as shown. Do not include the square brackets when you complete these formats as they are just placeholders

University of Portsmouth

School of Computing

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[Student No.]

Supervisor: [Name of supervisor]

Project unit Code [Project unit code]
[Month and Year, e.g. September 2004]

Title Page - the first project contents page, appropriately space vertically must contain the following information in the order shown below using 12 point Arial Narrow/Time Roman type throughout. Do not include the square brackets when you complete these formats as they are just placeholders.

University of Portsmouth

School of Computing

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[Student No.]

Supervisor: [*Name of supervisor*]

Project unit: [*Project unit code*]
[Month and Year, e.g. September 2001]

Abstract - [The abstract of the project should be between 150 and 300 words in length and constructed to say what the project was about, what you did and what were the conclusions]

Keyword List - [List of appropriate key words]

Acknowledgements Page - it is common practice to add a page listing those you wish to thank for their help. Acknowledgements should **only** be given to people who helped you directly with your work but were not involved in it. For example, if a colleague supplied you with a statistical analysis they should be acknowledged. However, it is not usual, necessary or desirable to acknowledge your parents, your wife or your friends.

Submission Form and Plagiarism Declaration

You must add the following two pages which require a signature. In practice one adds the signature to the final bound copies.

Declaration of presentation Standards

Include at this point a completed copy of the project submission checklist shown in workbook 10. Be warned, that if you tick this page and the relevant element is not found to be present, the work will be returned to you unmarked for correction.

Plagiarism Declaration

I confirm that the enclosed written work (including application code) is entirely my own except where explicitly stated otherwise. I declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

Signed _____ Date _____

Contents list, Table List and Diagram List

Include as appropriate

9.6 General Grade Criteria

Workbook 14 gives general guidance as to how projects will be assessed and also contains a table of the criteria used, although the emphasis given to various aspects may vary depending upon the nature of the work and should be explained to students in assessment specific criteria.

9.7 Project Examination Board Reflections

This is a discussion based on observations made on the marking forms and in the Examination Board regarding the quality of the submitted document as final Master's projects/dissertations. Most of these faults are due to shallow and sometimes very shallow thinking on the part of the project student and that is unacceptable at Master's level. The following points are to help both supervisors and students avoid known pitfalls and so produce a project document to a high standard.

9.7.1 Project Introduction – Study Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem definition – common deficiencies were no discussion or poor discussion of what problem was being addressed by the project. Without such a discussion it is almost impossible for a reader to get any grasp of what the project is about. In projects we want to see just ONE major problem theme not several so it often requires clear thinking to set it at the right level. (See workbook 6 section 6.2 and 6.11)

Target, Outcome and Actor – there is often considerable confusion over these ideas. The target is about what might happen in the real world based on the project outcome but often students cannot distinguish what the project will generate and what might be done with that project outcome by situation actors. As a simple example, students might say that the project outcome is "improved accuracy in data entry" when what they mean one supposes is that in their project they will design (say) a new training programme that will be used to get the real world target of improved accuracy. (See workbook 6 section 6.3, 6.4 and 6.5)

Speculation and Personal Theory – students are encouraged to speculate about problem causes and solution routes to arrive at a personal theory about the problem theme and how it might be resolved leading to a suggestion of an expected project outcome. A reader expects to see some indication as to what form the project outcome will take and in addition some discussion of the form to at least show that it is likely to go some way to resolving the stated problem theme and can indeed be used by the named situation actors. Unfortunately, the outcome was often missing or confused with the target and even when the Research Design was consulted a typical reader could still not see what the project outcome was supposed to be. Here we want to see ONE major form outcome for each project. (See workbook 6 section 6.6).

Research Question – often missing, badly worded, many of the 6 required features missing or multiple questions offered (sometimes all in one sentence). One common mistake was to ask a question in the form (or some equivalent) of "is it possible...." - the point is that in such questions the answer is almost always that it is possible so the research effort becomes pointless. (See workbook 6 section 6.8)

9.7.2 Project Introduction – Engineering Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem Theme - there was either no discussion or poor discussion of what problem theme the application being built was supposed to resolve. When this happens it is almost impossible for a reader to get any grasp of what the project is really about. (See workbook 6 section 6.2 and 6.11)

Functional Description - many students could not provide a short functional description of the application they were going to build. The most common thing for students to do instead was to provide an overview of the application architecture. This is hopeless as architecturally almost all Engineering projects are the same in that they typically have a database and a webpage for example. This implies that students cannot or do not want to make a distinction between how an application is built and what its purpose is.

9.7.3 Aim and Objectives

In many case these elements were missing altogether. In other cases one could barely link the aim to the Research Question or application description. However, of most concern was an apparent inability in many students to write a coherent and reasonable set of objectives. Not to be able to write an aim and more particularly objective is representative of a gross student weakness and it should never occur in Master's level work.

Aim - usually composed in a reasonable way but there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just one clear outcome for the aim. (See workbook 6 section 6.13, 6.13.1)

Number of Objectives - often there were far too many to be in any way practical for one student in the time available and often this was because they were all expressed at different levels of project resolution or confused with minor project tasks. (See workbook 6 section 6.13 and 6.13.2)

No Visible Outcome - there were many, many cases where the objectives had no visible outcome. Far too often we got phrases such as: "To understand...." or "To analyse...." without any object to the sentence so there was no outcome that was visible. Without a named outcome there is no way that the objectives can be seen to have been completed. (See workbook 6 section 6.13 and 6.13.2)

Not Project Bounded - there were many students who cited operational objectives as outcomes. For example it was common to see lines such as "To improve the workflow in the invoicing section". Here is a case where such an outcome cannot be written into a document or be in practical terms viewed and so cannot be used in a project. Typically, unbounded objectives refer to something that might happen based on the project outcome after the actual project has been completed (See workbook 6 section 6.13 and 6.13.2)

Objectives as Requirements - very commonly but still rather worryingly, many students, on Engineering projects, seem to think that objectives are the same as application requirements. (See workbook 6 section 6.13 and 6.13.2)

Objectives as Benefits - less commonly but still rather worryingly, many students, on Engineering and study projects, seem to think that objectives are the same as benefits. For example, in a study project on CRM systems what one often finds in place of project objectives is a list of benefits of implementing CRM. Similarly, for Engineering projects we see objectives written as a set of benefits of using the application being used later on in the real world. (See workbook 6 section 6.13 and 6.13.2)

9.7.4 Literature Review

In research the literature review is regarded as being essentially preparation of the mind. It follows, that to be serious about this step one has to be evaluatory and reflective as you read and write. Ideally one needs a strong theme which is used to weave an expository and exploratory discourse that unites and builds one's understanding and ideas with what has been written by other authors on one's core topic area.

For projects a full literature review is only needed in the case of a study project. For Engineering all that is required is a thorough overview of the application area. So for example, if an application where about Insurance brokerage then all that is required is a description of what brokerage is but only to the level necessary to understand the requirements. See workbook 5 but section 5.2, 5.6, 5.7 and 5.8 should be studied with care.

Structure - many reviews were poorly structured and one often felt that the students had just written down the material as it occurred to them without any thought as to a wider readership.

Theme - often there was no detectable theme connecting the various sections of the narrative and a reader would therefore be forced to guess at how all the various elements were connected.

Value Added - the most common flaw was to see a review that was entirely or almost entirely made up of quotations, paraphrases or summaries so that the 'hand' of the student was not detectable anywhere in the work. Such work is not evaluatory and gives no indication whatever that the student has learned anything of value or indeed anything at all. It is often the case that one feels the student has no notion of the literature being a driver that may mean they have to accept new knowledge, gain further experience, modify existing knowledge or even abandon what they thought was sacrosanct and sadly no belief that their own views and experiences are also important.

Citation Style - two things are evident here. Firstly, one finds that too often citations are limited to the Literature Review. Secondly, the actual style used is very poor and commonly we see the form (Burk, 1992 p45) placed at the end of a sentence or paragraph - this is not acceptable and can only mean the whole paragraph has been paraphrased. The ONLY correct use of this bracketed style is in a passing reference to a text. (See workbook 8)

Worthless Quotes/Paraphrases - it is unfortunately only too common to see an appeal to some text or other for information that tells you either common knowledge or makes an obvious observation and so the citation is worthless and is representative of weak scholarship and laziness where a student is just trying to add a citation because he knows that such things are desirable. For example, quoting an author who says that "Object Orientation is now routinely used in software construction" is representative of common knowledge or quoting an authors who "says change is inevitable" is something that one might regard as obvious.

9.7.5 Research Design

These were often far from satisfactory and often read like a joke delivered without the punch line. The students are taught that essentially there are two phases. The first phase is the process used to get primary data items that are formed into a set. Once the collection phase is completed we move on to the second phase of processing where the set of primary data items is processed to get an answer in the form of expected project outcome. Particular points are:

Research Phases - In many cases students were unable to distinguish the processing needed to get a set of primary data and processing of the set to get an outcome. It is quite common to see these two phases ignored or become completely muddled leading to a poor research outcome because the student loses his/her focus and often appear to have no clear idea what they are doing. The phases are:

Data Definition and Collection - a process or processes used to define and create a primary data set. It typically has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the data and present the data.

Data Processing - a process or processes used to manipulate the primary data set to get the project outcome.

No Outcome - often it seemed as if the student had no idea what project outcome to expect so when one looked at the processing there was no sense that the primary data was being used in any way to generate the required project outcome. See workbook 6 section 6.4

No Situation Actors – this occurs when we have an outcome but no idea who (person or persons) will use it to generate the target effects. See Workbook 6 section 6.5

Primary Data - many students seem to have only a vague notion of what primary data is and will often, very often, confuse or think that primary data is the same as the method of collection. This confusion is often evident with some students thinking that only questionnaire data could possibly be primary data.

Primary Data Definition - Primary Data is new data in the sense that it will not exist as a set until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data set is representative of some aspect of the area under investigation and can be processed to get a defined project outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

For example, one student took the definition and then read through an accounting system manual for his company and extracted all the functions and claimed that was primary data because he was going to use it to define what an accounts package should have by way of functionality but seemed unable to see that the manual had effectively done that already. (See workbook 6 section 6.7)

Research Method Justification - often students could not distinguish between Research Method and Data Collection Protocols. Research Methods are frameworks such as Case Study, Experiment, Action Research and so on. Collection protocols are based on: interview, questionnaire, observation, role playing, seminars, focus groups and so on. The sorts of justifications used are of the form "I have chosen case study because Saunders (2005, p92) said case studies are good..." - this is hopeless and implies no real thought. Justification must be built from a sound understanding of a particular Research Question, its expected form of answer (project outcome) and the Primary Data needs and at least an overview of which method is likely to be best in a given situation. (See Workbook 7)

Practicality - many plans were over-complicated with students trying to use multiple methods and then ending up with masses of data they had no idea what to do with. There is only limited time and so students should be encouraged to focus on just one Research Method although of course several collection protocols may be involved.

Data Collections - in many cases all an examiner was able to see were presented results but often one simply could not tell if any primary data set was involved and the results just seemed to appear 'out of the air'. The marking guide is quite specific and projects must be clear about both processed data and raw primary data sets. Without this we cannot feel confident that students have done any actual research. Typically, the primary data set is placed in an appendix and might be in the form of a summary table of questionnaires results or summarised transcripts. Correspondingly, the processed primary data set is expressed as charts, graphs, tables, reports and so on in the body of the project report.

Processing - this is one of the most disappointing elements. Processing is all about transforming your primary data set into the project outcome. Far too often all we see is the processing of individual primary data items with no attempt or very weak attempts to really supply an answer to the Research Question in the form that was specified.

Location - there were quite a few projects where it was more or less impossible to see where the primary data came from and often this was accompanied by a very ordinary set of results that could have been written by almost anybody with a superficial knowledge of the subject area.

9.7.6 Research Results Processing

There were some very good examples but often this section was very routine and very disappointing.

Repeating - it was very common to see a chart for example, displayed and then underneath the student simply repeated the data that was in the chart in words. Such a practice is worthless. What any data related narrative is supposed to do is to tell the reader what the data means and what implication it might have - that is we expect to see some analysis and evaluation of the data in terms of the Research Question.

Focus - the focus of processing the primary data is to create a kind of transformation that generates from the primary data set the expected project outcome - unfortunately, this aspect was often absent. Typically in a survey for instance we have page after page of charts analysing individual data items but no attempt to sum it all up and reach a conclusion based around the Research Question.

9.7.7 Evaluation and Conclusions

These sections in a lot of student work are indistinguishable. The reason there are two sections with marks attached is because:

Evaluation - here one focuses specifically on the project outcome and research methods - that is we evaluate our product (outcome) and the methods used in its generation. Notice here this is NOT about generating the outcome that would have been done in the primary data processing section

Conclusions - here the attempt is made to say what it all means - that is trying to generalize the findings. So for example, suppose the outcome is about the use of Agent technology in eCommerce web sites then in conclusions one might try to say what a particular project outcome means for any eCommerce site or in fact any website. In a similar kind of way, if a particular application had been built we might try to say whether it might be applicable in other situations or whether some features of the design can be transferred to all applications of that type.

9.7.8 Ignorance of Project Marking Criteria

Many students show an almost complete disregard for the way a project is marked and so often automatically lose marks. Students must therefore carefully study the marking forms so that they know what components are regarded as essential to any project and therefore carry marks. (See workbook 11 or 12 as appropriate)

10. WORKBOOK 10 – FORM: PROJECT SUBMISSION

This form **must** be completed and included in your project submission. If you are unable to tick every box then your work is not ready for submission.

Project Word Count	Exclude appendices. If maximum is exceeded marks may be lost or the project rejected
	The report length is within the stated guidelines (15,000 words maximum excluding appendices)
	I have included all making elements indicated in workbook 11 Or 12 as appropriate and noted the marking guidance notes
	I have studied the guidance notes on common project faults found in section 9.6
	I have prepared two bound copies of all my project work including any separate appendices
	I understand that I may use one or both sides of the paper when printing the report.
	I have included a full contents list, table list and diagram list all numbered consistently
	I have used good quality A4 paper, normally in portrait orientation with a weight between of 80 and 100gsm.
	I have made sure that the pages are in the right order and none are missing
	I have used MS word .doc format
	I have formatted the front cover and title page as required and added the necessary plagiarism declaration.
	All my text is single line spaced at 6 lines per inch/25.4 mm.
	All my main text, including headings is in 12-point font (Arial Narrow is recommended)
	All my text in tables and diagrams is 10-point font (Arial Narrow is recommended)
	All main text is right and left justified
	No headings at whatever level are indented
	Headings are NOT followed by a blank line
	Headings are in the same font and size as the main text but are shown in bold type
	No numbered headings are orphaned (that is all heading must be followed by some text not immediately by another heading)
	I have used a single blank line to separate paragraphs
	All chapters and appendices are numbered sequentially (1, 2, 3,...)
	All subsections are numbered (2.1, 2.2,...) and none of my sections numbers exceed three levels (1.2.1, 1.2.3 ...)
	All my margins: (top, bottom, left and right) are 20mm
	All pages have footers in 10-pt Arial Narrow in form: Page 12 of 97 - J.Letto Student No. 567543 Submission Date: 12.10.07
	I have cited other people's work properly using the Harvard APA format
	I have included all citations in my list of references
	My abstract accurately summarises all of the report, not just parts of it
	All my chapters and appendices start on a new page
	I have included appendices, where appropriate, covering: project specification, Project Plan, Requirements document(s), design document, screen shots, source code, user documentation, test results, evaluation results, questionnaires, etc.
	My supervisor has read each chapter as the work progressed.
	My supervisor has read the whole report
	I understand that indented sentences can be used where appropriate but bullets are not recommended (see 9.3.1)
	I understand that page headers are not required
	I understand that each of my chapters should start with an introductory section that explains what the chapter is about
	I understand that each of my chapters should end with a summary and a helpful link to the next chapter
	I have fixed a copy in .doc format of the project document and any appendices on floppy/CD/DVD to my project submission
	All my primary data (including requirements data) is original to this study and collected by me for this specific project purpose
	My primary data collection is available in the project document or appendix (if necessary in edited or summarised form)
	Engineering Projects only - I have included an executable file of my application on an attached floppy/CD/DVD
	Engineering Projects only - Application Operating instruction are on the attached floppy/CD/DVD as well as in the appendix
	Engineering Projects only – In my application I have not used illegal copies of any software or included any software where there is an expiry date which may render the application inoperable in the future.
	Engineering Projects only - I understand that the copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If, and only if, this is not possible then I have included in my project a supervisor signed set of screen shots in the appendix confirming that he/she has viewed the application in action.
Signature of Student. _____ Date. _____	

11. WORKBOOK 11 – FORM: STUDY PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

STUDY STYLE		Postgraduate Project Marking Form						STUDY STYLE	
Name of Student							HEMIS No.		
Brief Project Title							Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion						Re-Work	New Topic	
Name: Supervisor									
Name: Marker									
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker		
Project Unit	PJ.NCC								
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected						
External Examiner	N	Y	Refer to the External Examiner (if "Y" add comment in section G)						
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit						
References: See Workbook 11 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes									
Section A - Marks for Planning and Preparation							Weight	Mark	
1.	Project specification, including project plan						5		
2.	Review of the topic area literature						15		
Sub-Total							20		
Section B - Marks for Project Introduction									
3.	Presenting problem and its exploration including the Research Question						5		
4.	Discussion of the project's scope, scale, aim and objectives						10		
Sub-Total							15		
Section C - Marks for Project Primary Data Research and Outcome Generation									
5.	Selection and justification of Research Method						5		
6.	Primary data collection plan including data specification						10		
7.	Primary data processing plan to get expected outcome						10		
8.	Presentation and discussion of the collection of Primary Data						10		
9.	Description and discussion of main project outcome						10		
Sub-Total							45		
Section D - Marks for Project Evaluation and Conclusions									
10.	Evaluation of the project outcome (Project Specific)						5		
11.	Evaluation of project practice (Project Specific)						5		
12.	Statement of conclusions and reflections (Project Generalisations)						10		
Sub-Total							20		
Section E – Qualitative Assessment matrix based on University Grade Criteria									
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words			
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless			
3.	Report structure	very poor	poor	satisfactory	good	excellent			
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report			
5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours			
6.	Project idea	trivial	easy	modest	challenging	Difficult			

7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Primary data collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Data processing	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
14.	Main project outcome	Worthless	obvious	useful	original	exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

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Section G – Note here elements you want brought to the attention of the External Examiners

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Signed		Dated	
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Study Format Marking Form Guidance notes These notes must be read in conjunction with the grade criteria and associated notes found in Workbook 14.
Section A - Marks for Planning and Preparation
1. Project specification, including project plan
Reference: Workbook 3 section 3.3 for general notes and section 3.5.2 for an example specification
Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.
2. Review of the topic area literature
Reference: Workbook 5 section 5.2 and 5.6 in particular, Workbook 8 and Workbook 9 section 9.6.4
Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers and generally be focused on the central project topic. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.
Section B - Marks for Project Introduction
3. Presenting problem and its exploration including the Research Question
Reference: Workbook 3 section 3.3 and 3.5.1, Workbook 6 sections 6.2, 6.6 and 6.7 and Workbook 9 section 9.6.1
All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Research Question with a defined form of answer (project outcome). It is very common to see an expression of a problem as "my problem is to find a solution to..." or expressed in such a way that it is in effect a solution and such expressions are indicative of students who do not know what the problem is but nevertheless know what the solution is. Similarly, students who list multiple problems, have no Research Question (or a very poor one) and do not discuss the form of outcome expected are embarking upon projects where there is no clear focus and these typically fragment when it comes to the core research and one most often cannot find any clear project outcome later in the work. It is also useful at this stage if there is some indication of the Basic Activity for Generating Data (BAGeD) so that one can feel sure that the student is aware of what primary data they need in order to generate the intended outcome.
4. Discussion of the project's scope, scale, aim and objectives
Reference: Workbook 3 section 3.5.2 (example), Workbook 6 section 6.1 and Workbook 9 section 9.6.3.
Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition, expected form of outcome and Research Question all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.
Section C - Marks for Project Primary Data Research and Outcome Generation
5. Selection and justification of Research Method
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a rational and thoughtful choice of Research Method focused on resolving the stated problem theme. In practice this implies a consideration of primary data needs, location of primary data and the collection protocols that might be used. Markers should guard against rationales that amount to saying that some text book or other said method X or Y was good for certain kinds of scenario – that is copies of generalisations about Research Methods found in books do not amount to a rational for a specific research situation. Furthermore, markers need to feel confident that the student understands the distinction between a Research Method and the collection protocols used within them.
6. Primary data collection plan including data specification
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
This is a crucial stage in a research based project and markers must be confident that the plan is practical. A marker must look for a clear core activity represented by a statement about of BAGeD and that core activity should be surrounded by whatever other processes are needed to ensure reliable collection of the primary data. The whole primary data collection plan has four steps which must be visible in the project document: data definition, data location, data collection and how the whole collection of primary data is to be presented. Markers should also take care that the formation of a collection of primary data is not confused with the processing of it to get the stated project outcome.

7. Primary data processing plan and presentation of the expected outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for clear evidence that the student has taken the collection of primary data they obtained earlier in the project and now process that whole collection to get to a clear presentation of the project outcome. It is therefore important that markers can see what processes were applied to the collection of primary data to get the outcome – without this process visibility there is no evidence as to how the project outcome was actually obtained. Markers should be wary of processing plans that say such things as “I will look at the data” or “I will analyze the data” or “I will use SPSS” as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same data collection they could apply the same processes and get the same or at least a very similar outcome.
Markers should also be aware that very often students will often process individual data items – such as might be found on a questionnaire, but never get to a point where the stated project outcome is derived from the collection of data.
8. Presentation and discussion of the collection of Primary Data
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for visible signs of the collected primary data. The primary data collection is most often presented in tabular form in the appendix and might be displayed as graphs, charts, tables or diagrams in the main project document.
9. Expression and description of main project outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
The intended project outcome must be clearly visible – for example if the intended outcome is a model then that must be clearly shown in some acceptable form and be based on the processing plan outline in section 7. Markers must therefore take great care that the presentation of primary data and the processing of individual data items in the collection are not offered as a substitute for the student generating the intended project outcome.
Section D - Marks for Project Evaluation and Conclusions
10. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project outcome so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution (project outcome) or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project outcome. The section is not intended for vague thoughts about the topic but a considered evaluation of the project outcome when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
11. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate here. This section is important as this is where one expects to find some information on what the student has learned about the way they work and the tools they used. It is unfortunately often the case that students have very little idea about what they did apart from stating vague activities such as “look at”, “analyze” or “use SPSS” so without anything concrete to evaluate they resort to the routine and say “the survey process went very well” or “my case studies generated useful data” or else they simply ignore this form of evaluation altogether. Evaluation of project practice is difficult and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking ‘how did I do it’, ‘was it successful’ and ‘could I or should I on reflection have done it another way’. Additionally, one needs to be aware of any constraints involved, including time management and particular skills that might have impacted on the use of best possible practices.
12. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a project outcome was based on case studies and the outcome was a review of IT outsourcing in Hong Kong then here we might expect to see the student consider the outcome he obtained which refers to Hong Kong and then consider and discuss whether that outcome has wide applicability, for example, to China, South East Asia or even the world as part of a Global economy or is it just specific to that local situation. Essentially, one is asking what do the outcome ‘mean’ when set in a wider setting. It follows that the focus of awarding marks here is for project generalisations.
It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such as future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

12. WORKBOOK 12 – FORM: ENGINEERING PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

ENGINEERING STYLE		Postgraduate Project Marking Form				ENGINEERING STYLE	
Name of Student					HEMIS No.		
Brief Project Title					Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion				Re-Work	New Topic	
Name: Supervisor							
Name: Marker							
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker
Project Unit	PJ.PEA						
Plagiarism	N	Y	Is PLAGIARISM or another unfair act suspected				
External Examiner	N	Y	Refer project to the External Examiner (if "Y" complete section G)				
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit				
References: See Workbook 12 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes							
Section A - Marks for Planning and Preparation					Weight	Mark	
1.	Project specification, including project plan				5		
2.	Review of the application/product area and its client/business setting				10		
Sub-Total					15		
Section B - Marks for Project Introduction							
3.	Presenting problem and outline proposal				5		
4.	Discussion of the project scope, scale, constraints, aim and objectives				10		
Sub-Total					15		
Section C - Marks for Project Primary Data Research and Outcome Generation							
5.	Detailed requirements collection plan based on proposal				5		
6.	Analysis of requirements: functional, performance, technical and usability				5		
7.	Presentation, analysis and discussion of the design				10		
8.	Discussion of build process and design implementation				10		
9.	Application testing process and results				5		
10.	Implementation plans				5		
11.	Attributes of the project artefact (e.g. quality, reliability, etc)				10		
Sub-Total					50		
Section D - Marks for Project Evaluation and Conclusions							
12.	Evaluation of project product against requirements (project Specific)				5		
13.	Evaluation of project practice (project specific)				5		
14.	Statement of conclusions and reflections (project generalisations)				10		
Sub-Total					20		
Section E – Qualitative Assessment matrix based on University Grade Criteria							
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words	
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless	
3.	Report structure	very poor	poor	satisfactory	good	Excellent	
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report	

5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours
6.	Project idea	trivial	easy	modest	challenging	difficult
7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Requirements Collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Design Expression	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
15.	Artefact Evaluation	worthless	obvious	useful	original	Exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Engineering Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.1 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the application/product area and its client/business setting

Reference: Workbook 5 section 5.2 and 5.6, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers. In Engineering projects the expectation is that the review will focus on the application area and be in enough detail to at least understand and gather the requirements. It is permitted to include technical material if they have a special or unusual significance to the application area but in so doing students must be aware that the routine inclusion of what at this level might be regarded as common knowledge in computing/IT will not attract any marks. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and Outline Proposal

Reference: Workbook 3 section 3.3 and 3.5.1 Workbook 6.2 and 6.5, Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Application Outline expressed as a functional description. It is very common to see an expression of a problem as "my problem is to find a solution to..." and this is indicative of students who do not know what the problem is but nevertheless know what the solution is. Students who list multiple problems, have no functional description (or a very poor one) are indicative of projects where there is no clear focus and these typically fragment when it comes to requirements gathering and often end in a very trivial application. Markers should be aware that students may avoid giving a functional description and instead offer a generic architectural one and this must be penalised as the student clearly does not know what function the application supplies

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.1 (example), Workbook 6 section 6.11, 6.9 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition and Application Outline all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Detailed requirements collection plan based on proposal

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful consideration of the Requirement Gathering process focused on obtaining sufficient information to build the intended application and resolve the stated problem theme. In practice this implies a consideration of application functions, location of requirements data and the collection protocols that might be used. Normally in research one would expect a rationale for the choice of Research Method but for Engineering projects it is taken for granted that the method is requirements gathering. Instead one should look for a clear focus on constructing a feasible and comprehensive requirements document based on the application outline. Furthermore, markers need to feel confident that the student understands the distinction between Requirement Gathering as a Research Method and the collection protocols used within it.

6. Analysis of requirements: functional, performance, technical and usability

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers must look for a clear Application Proposal and a requirements catalogue. Here one needs to see a discussion of the requirements to ensure they are credible (realistic), comprehensive, complete and stakeholders have been considered. One might also usefully consider the approach that was taken to gain them and whether they are of the form of strategic, tactical or operational.

7. Presentation, analysis and discussion of the design
Reference: Workbook 9 sections 9.6.5 and 9.6.6 and Workbook 7 section 7.9
Marks are awarded here for clear evidence that the student has taken the requirements obtained earlier in the project and processed them to get a suitable design. Therefore, markers must be able to see a clear link from requirements to design and where necessary observe how the requirements were processed. Markers should be wary of processing plans that say such things as "I will look at the requirements" or "I will analyze the requirements" as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same requirements they could apply the same processes and get the same or at least a very similar outcome.
8. Discussion of build process and design implementation
Reference: Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for a rational discussion as to what architecture, components, languages and tools and so on are needed to best implement the design. This discussion may also imply the various situation constraints have to be considered as well.
9. Application testing process and results
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers must look for evidences of a testing plan and a consideration of test results. Typically the plan and results are placed in the main project document in outline form with the details in an appendix. Often students will just discuss white or black box testing or regression testing or something similar but without any actual test plans or results – in such cases marks should not be awarded as these materials is considered common knowledge at this level – however brief references to it are permitted.
10. Implementation plans
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a comprehensive implementation plan – it need not be extensive or in minute detail but it should cover installation, user training, data conversion/loading, change over, user acceptance and hand-over.
11. Attributes of the project artefact (e.g. quality, reliability, etc)
Reference: none
The intended project application must be clearly visible and available to run directly from a disc or DVD. Markers are to award marks based on their perception of the general quality of the application if they were to put themselves in the place of a user. Assessment may then consider colour scheme, ease of use, operating instructions, presentation (does it look as if its finished), speed, etc.
Section D - Marks for Project Evaluation and Conclusions
12. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project application so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project application. The section is not intended for vague thoughts about the situation or application but a considered evaluation of the project application when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
13. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate. This is where one expects to find some information on what the student has learned, the way they work and the tools they used. It is often the case that students have very little idea what they did apart from being able to state vague activities such "look at" or "analyze" so without anything concrete to evaluate they resort to the routine and say "the survey process went very well" or "the UML modelling was straightforward" or else they simply ignore this form of evaluation. Evaluation of project practice is difficult because the student must ask searching questions related to process success and the notion of good and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way' or "what were my constraints".
14. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a an application was for eCommerce selling shoes it might be possible to ask what aspect of that application could be re-used to sell other product. It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

13. WORKBOOK 13 – FORM: PROJECT MARKING RECONCILIATION

The form shown below is included for reference only so that you can see how your project will be marked.

Project Mark Reconciliation Form		Final Agreed Mark (%)	
Name of Student			
Brief Project Title			
Name: Supervisor			
Name: Second Marker			
Name: 3rd Marker			
<p>Cause – in this box, describe, for each applicable section, why the marking disagreement occurred.</p> <p>Rationale – in this box, If a mark can be agreed, explain the rationale used to reach agreement. Please note that it is only necessary to agree the total mark for each section not individual category marks.</p> <p>Irreconcilable - If you cannot agree a mark leave rationale blank and it will be filled in by a third marker who will place a tick in the small square box.</p>			
Section A - Marks for Planning and Preparation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section B - Marks for Project Introduction		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section C - Marks for Project Primary Research and Outcome Generation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section D - Marks for Project Evaluation and Conclusions		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			

14. WORKBOOK 14 – SUPERVISION AND MARKING GENERAL GUIDANCE NOTES

1. **Presented Work** - Marker's are reminded that any marks awarded must be solely based on the assessment of work presented within the mark categories listed on the mark forms. It is not permitted to award marks for "hard worker" or "tried very hard" or "was a good student" or any similar observation as there are no relevant mark categories and this kind of criteria is almost impossible to evidence.

When an Engineering artefact is presented it should be viewed in action to ascertain the mark for "Attributes of the Project Artefact". The copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If this is not the case then markers must assume that there is no evidence for the application and set the mark accordingly.

2. **Word Count** – on the project submission form there is a space for a word count (excluding appendices) and if this is exceeded then it is indicative of a deliberate attempt to go beyond recommendations and you may therefore find that it leads to laboured descriptions or inclusion of irrelevant material in the project document and you should therefore mark accordingly.
3. **Structure** – mark categories do not necessarily represent chapters in a project document and so Marker's need to be aware that a particular project may be structured in a way that does not correspond to the sequence presented on the mark forms (though it is recommended to do this when possible). However, all the elements on the marking form must be visible in the work presented.

Although it is recommended that the mark form sequences be followed in the project document that does not mean that there has to be a chapter for each mark category. Students, therefore, should be encouraged to merge sections in order to produce a concise document. For example, it is perfectly possible and reasonable to merge the two evaluation sections and conclusions into one chapter as long as the relevant mark elements are still visible.

4. **Appropriateness** - any work presented must be within the prescribed subject area for the course. If a marker suspects that this is not the case then they should consult with the relevant course leader for clarification. In such accepted cases markers must regard the primary data and its processing as not being appropriate and mark with that in mind.
5. **Evidence** - the project report or appendix must contain sufficient evidence that the core project research work has been done (not the literature review). That is, in the case of study project a marker must be able to see the primary data collection appropriately presented (usually in an appendix). In the case of Engineering projects it must be possible to see a suitable requirement document or catalogue (possibly in the appendix). Once the primary data is visible then it must also be possible to see how that data was transformed into the intended project outcome.
6. **Literature Support** - when marking Literature Reviews their content must be seen to be focused on the topic area and address clearly the associated problem theme without any irrelevant material with the intention of offering a concise discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (see section 5.1)
7. **Grade tables** - markers must be aware of the criteria associated with awarding a given overall mark as they may be required to justify it to the UAB in terms of the criteria stated in the table shown below.
8. **Process** – when marking it is important that the process used to get an outcome by the student is visible in the project document. In practice this means that it is possible to perform the following trace: presenting problem, discussion of how problem might be resolved, suggested form of project outcome, research design and execution, generation of stated outcome, evaluation and conclusions – viz:

Engineering – typically, the process starts with a business related or technical problem theme leading to a research plan for the collection and discussion of requirements and their transformation into a suitable design and associated architecture. From this there should follow a build, implement and testing process with the whole project completed with suitable project specific evaluations and conclusions containing generalisations.


Study – typically, the process starts with a business or strategic IT related problem theme leading to a research plan for the collection and discussion of primary data and its transformation into an outcome that would resolve or go some way to resolving the stated problem theme. The whole

project is then completed with suitable project specific evaluations and conclusions containing generalisations.

Marks	Master's Level Grade Criteria
70 – 100	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Excellent work - able to express an original reasoned argument in a lucid manner by reviewing & critiquing a wide range of material. Original, critical thinking based on outstanding insight, knowledge & understanding of material. Material contributes to current understanding & is of potentially publishable quality in terms of presentation and content ▪ Wide reaching research showing breadth & depth of sources
60 – 69	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Clear, balanced coherent critical & rigorous analysis of the subject matter. Detailed understanding of knowledge & theory expressed with clarity ▪ Extensive use of relevant & current literature to view topic in perspective, analyse context & develop new explanations and theories
50 – 59	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Detailed review and grasp of pertinent issues & a critical contextual overview of the literature. Thorough knowledge of theory and methods & uses this to underpin arguments and conclusions ▪ Confidence in understanding and using literature
40 – 49	<ul style="list-style-type: none"> ▪ Demonstrates grasp of key concepts & an ability to develop & support an argument in a predominately descriptive way with valid conclusions draw from the research ▪ Familiarity with key literature which is cited and presented according to convention ▪ Logical & clear structure, well-organised with good use of language and supporting material
0 – 39	<p>FAIL – Some knowledge of relevant concepts & literature but significant gaps in understanding and/or knowledge. Little attempt at evaluation, conclusions vague, ambiguous & not based on researched material. Limited or inappropriate research. Deficits in length, structure, presentation &/or prose.</p>

15. WORKBOOK 15 – FORM: UNIT FEEDBACK REPORT

This form may be used by you to feedback to the University your experiences in the courses. It is normally sent to your tutor at the end of the course.

Unit Level Feedback – Delivery Evaluation for Online Units										FF.2.3		Page 1 of 1	
This student feedback questionnaire is intended to help students provide constructive feedback to the unit lecturer.													
Student Name (Optional)										Cohort			
Unit Name													
Lecturer													
Q	 Good					Place a ✓ to rate each factor from strongly disagree to strongly agree in one of the 5 boxes							
1						Chat sessions started promptly.							
2						Char sessions were structured usefully for learning.							
3						Chat content helped my understanding							
4						Chat Tutor handled student questions sympathetically							
5						Chat Tutor used helpful examples where necessary							
6						Chat Tutor answered session questions in a helpful manner.							
7						Chat sessions stimulated me to think beyond the material delivered.							
8						Chat topics were often related to real-world situations.							
9						Chat Tutor encouraged students to participate during the session.							
10						The Tutor was expert in the subject area.							
11						The written notes provided were helpful to my learning.							
12						The study pack Workbooks were helpful in my assessment preparation.							
13						The 5 milestone tests helped me to confirm my knowledge.							
14						Tutor responded in a timely fashion to discussion board questions.							
15						Tutor responded in a timely to my email communications.							
16						Tutor was sensitive to the problems of individual students.							
17						The assessed work stimulated me to think deeply about my project.							
18						Feedback on my progress was available.							
19						The topic approval process helped me think clearly about my project.							
20						Written assignment specifications were clear.							
						For Official Use Only							
General Comments:													

16. WORKBOOK 16 – USEFUL BAGeD WORDS

These words and their definition may be used to formulate your BAGeD idea is a research design

Account for - Explain and clarify something by giving reasons

Analyse - Resolve something into its component part, or examine critically and minutely.

Appraise - This is best thought of as something like forming an opinion about something. It might be quite simple such as forming an opinion as to whether something is good or bad but more often that not it's about forming an opinion about something after assessment or evaluation with regard to what can be done - so we might appraise whether a process for example should be left unchanged, modified or made redundant.

Assess - Determine the value of something. Similar to evaluation but it is often useful to think of evaluation as a qualitative process and assessment as a quantitative one.

Catalogue - This means to create an ordered collection of some sort where there is a logical order and the essence of the task is to enumerate and describe

Collect - This is very simple as all one does is to identify the data and literally collect it as you see it. So if I were looking for SPAM instances then as soon as I find one I just file the whole SPAM email away for later processing.

Compare - Look for similarities between one or more things.

Compile – similar to list but here the implications is you search many sources but in doing so having to make decisions in the process

Contrast - Look for differences between one or more things.

Criticise - Make a judgement, backed by a discussion of the evidence or reasoning involved, about the merits of theories, opinions, .

Define - State the exact meaning you are attaching to a word, phrase, idea, process etc

Describe - This may be used freely to describe in detail situations, events, opinions, feelings and so on.

Differentiate - Look for elements that would clearly differentiate between two or more things

Discuss - Explain something by giving two sides of the argument

Evaluate - In some cases one might want to look at events or people or processes in order to form an evaluation and that collection of (usually) small evaluations form our primary data.

Examine - Look carefully at the details of an argument, theory, or plan etc

Explain - this is about saying why something is. So one can describe an event but also explain why it occurred

Explore - You can use this word but we are always exploring so it must be used with care. Typically, in these cases one starts with a model of some kind and uses that to inform the exploration process. For example, we might have a theoretical process map and we use it to explore various working processes to see if we can find flaws or weaknesses and then those descriptions of flaws or weaknesses become our primary data.

Illustrate - Here one is trying to find a way to express in a very pointed way some situation or thing. So one might identify an instance of SPAM and then illustrate why it might be harmful so adding poignancy to the example you have extracted. Mostly, it is best to think of illustration as a way of giving an example but in that example you want to make just one clear point.

Interpret - The essence here is that one is typically observing something to describe it but also to find some meaning in what is being done. This is often used when looking at social groups or situations where it is not always obvious why certain actions occur

Justify - Show adequate grounds for decisions and conclusions and answer the main objections likely to be made about them.

Link - This is often a neat way of dealing with some types of data where you think there is a relation but the relation itself is not known with any certainty. One often finds this kind of activity evidence in a matrix formulation or representation.

Outline - Give the main feature or principles of an object, omitting minor details and emphasising structure and arrangement

Portray - This might be a useful verb if you were looking for types in a study. For example, if you were looking for people who get involved in illegal downloads one might want to portray them in some way.

Profile - This is similar to a description but it focuses on just the key points. For example, if we were looking for best practice in a situation then we might start by just profiling a given task – that is we outline the main steps and rationale to start with. The idea is similar to an outline but implies deliberate selection of certain aspects.

Represent - Sometimes you might plan to build a representation of some event as your primary data. For instance, if one was looking for security awareness in employees then of course one cannot "see" it or collect it as such. In these cases we must try to find a way of representing an awareness level or feeling and that representation forms our data.

Summarise - Give a concise and lucid explanation or account of something, presenting the chief factors and omitting minor details and examples

Synthesise - Resolve something into a whole from its component parts.

Exercise 004b.01a – Finding a Basic Activity Word Spotlight

This exercise and example sheet takes you through the whole of the research process. I have summarised all the things you need to know and provided some partial and some full samples. You must go to the partial example and complete them by looking at various elements and using them to write a research question. I will NOT be providing answers for all these samples (you will be doing that in discussion) and they are there for you to practice and use in your groups. Please don't avoid the work, you MUST get to a stage of knowing that what you have written is correct – if you don't know it's correct then you are not ready to do your own.

To start this off complete one or more of the examples and post the resultant Research Question into the discussion Board where I and others can comment.

Basic Activity Word – this entry will give a concise definition of the word
WARNING – in the Research Methods course the following key words have a defined meaning and you MUST study the relevant entries in the workbook. DO NOT assume that you know what these mean else you are likely to get into considerable difficulties.
Problem – this must define a single core problem for which you are going to find a solution route
Target – these are the effects that will be evident in the real world if the problem can be solved. It is permissible to list more than one effect but it is best to look for the principle one.
Outcome – this is the object you will generate as the final product of your MSc project. Possible outcomes are characterised by nouns so might be: reports, models, frameworks, policies, strategies, position papers, reviews, procedure description, best practice descriptions, dictionaries, lexicons, concordances, protocols, dossier, diagrams, charts, plans, etc.
Actor - It is normal when you define your outcome to say who the actor or actors are (meaning persons) who will use your defined outcome and to show that its use by them leads to the target effects
Activity and Data Spotlight – this is just about focusing on exactly the primary data that you need and nothing else. There are two parts really here: the activity: account for, analyses, collate and so on and the spotlight, the place where the data comes from
Research Question – this is a sentence expressed as a lucid question that connects the various features and expresses the direction of your research and summarises your whole project. The 6 elements are: interrogative, outcome, actor, problem, target and spotlight (data) - IO-APTS. The acronym IO-APTS is the correct order of these features in a sentence when the interrogative is “what” but for other interrogatives the order of features may need to change if you are to produce a valid sentence in English. Possible interrogatives are: Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, s/are, and can.
Research Method – choosing a method will depend on many factors such as: context, time available, skills available, practicalities, access, reason for the study, what kind of outcome you want, cost, nature of the study quantitative/qualitative, scale, control, and sensitivity of the data and so on. In this set of examples I choose a Research Method based largely on the basic purpose of the study. Basic purpose is usually assumed to provide as an outcome one of the following forms: express an understanding, an exploration, a description, an explanation, an improvement suggestion, build something or prove something. Common Methods and typical uses are: Case Studies – useful when trying to understand a situation or practice Vignettes - useful for exploring a situation in order to illustrate its major features Action Research – useful when it is desirable to improve a situation by working within it Experiments – useful when one is trying to prove or more usually indicate the truth of some proposition Quasi-Experiments – as for experiments but the experiment can only be simulated Surveys – useful when trying to describe a situation or effect Biographies/History – useful when one wants to explore a situation in order to replicates it or improve it Grounded Theory – useful when the area under study is barely understood but needs to be explored Ethnography – useful when one wants to describe a situation of some kind involving behaviour Requirements Gathering – useful when one wishes to build a real world object
Collection Protocol – this describes the means by which the primary data is actually collected: interview, questionnaire, observation, role playing, seminar, focus groups, document or record searching etc
Pre-Processing – this describes how the primary data in its raw collected form is processed into a structured collection of some kind.
Outcome Processing – this describes how the structured primary data collection is used to generate the intended outcome.

Account for - Explain and clarify something by giving reasons
Problem – inventory discrepancies leading to additional costs and delivery delays.
Target – reduced inventory cost and assured delivery times to customers
Outcome – revised inventory processes model
Actor – manager or managers responsible for inventory systems
Activity and Data Spotlight – to account for (activity) inventory discrepancies caused by current procedures (spotlight)
Research Question – what (interrogative) revised inventory processes model (outcome) can be used by inventory managers (actors) to make changes to the current system in order to reduce or eliminate inventory losses (problem) so that costs are reduced and customer delivery times assured (target) by exploring and illustrating features of working practices in the current inventory system that might account for inventory discrepancies (spotlight).
Research Method – in this case I am basically exploring this problem situation looking for illustrations of why discrepancies occur so that leads me to think that the method of Vignettes is the most suitable research model here.
Collection Protocol – record searching coupled with interviews .
Pre-Processing – this raw primary data collection will be pre-processed in order to structure the collection into the form of a catalogue of processes description each with a weakness assessment.
Outcome Processing – the catalogue produced in the pre-processing stage will be used to generate the outcome of a set of revised inventory processes using the company best practice model. This outcome will then be used to reform the way the inventory is managed and in so doing allow managers to generate the target of reduced inventory losses, reduced costs and assured delivery times.

Analyse - Resolve something into its component part, or examine critically and minutely.
Problem – delays and errors in generating audit request data
Target – reducing the time taken to generate the requested data and at the same time improve its accuracy.
Outcome – a report with recommendations
Actor - management
Activity Data Spotlight – to analyse (activity) the process used to extract data from the accounting systems for audit requests (spotlight).
Research Question – what (interrogative) recommendations (outcome) can be generated and used by management (actors) to plan for the enhancement of current audit request procedures in order to ensure that delays and inaccuracies (problem) are eliminated (target) by a close analysis the audit request protocols (spotlight).
Research Method – here my primary need is to understand the audit request process and so I will treat each request as a small case study .
Collection Protocol – a form of role playing will be used to duplicated and simulate the request
Pre-processing – the extracted audit data and the request will be pre-processed into a matrix which will be formed by listing the request, process used, data sensitivity, classification and auditors assessment of data quality...
Outcome Processing – using a process model the data will be used to form a mapping of requests to consequence and hence derive a report with recommendations to management on the effectiveness of current audit processes. This outcome will then be used by management to make an informed decision on the way audit request are handled in the future and in so doing generate the target of reducing the time taken to generate the requested data and at the same time improve its accuracy.

Appraise - This is best thought of as something like forming an opinion about something. It might be quite simple such as forming an opinion as to whether something is good or bad but more often that not it's about forming an opinion about something after assessment or evaluation with regard to what can be done - so we might appraise whether a process for example should be left unchanged, modified or made redundant.
Problem – poor IT staff utilization as is apparent in increasing staff cost and high consultancy fees.
Target – increased management awareness on current IT staff utilization practices
Outcome – an assessment report on cost savings and other benefits that might accrue from a better utilization of existing staff.
Actor - departmental managers
Activity and Data Spotlight – to appraise (activity) the staff utilization practices with regard to IT technicians (spotlight)
Research Question – How can (interrogative) effective utilization of IT staff (problem) be achieved after an appraisal of staff utilization practices (spotlight) in order to generate an assessment report (outcome) for use by departmental managers (actor) to aid and inform them in job distributions so that a reduction in costs can be achieved based on a maximization of existing staff's abilities (target)?
Research Method – my basic need here is explain the process so that leads me to believe that the histories method is most likely to give me a suitable research model.
Collection Protocol – document searching looking for example of utilization and how they were decided upon. It may be necessary to supplement this with linked interviews .
Pre-processing – the raw primary data will be catalogued into groups based on a manager's assessment of each employee focused on the current company standard payroll scales.
Outcome Processing – the grouped utilization practices and managers assessment will be analysed using an in-house workflow model to derive an assessment report of possible cost savings and other benefits that might accrue from a better utilization of existing staff. This outcome will then be used to brief departmental managers in order that the target of increased management awareness on current IT staff utilization practices is achieved in preparation for the bi-annual leadership meeting where this problem theme will be discussed.

Assess - Determine the value of something. Similar to evaluation but it is often useful to think of evaluation as a qualitative process and assessment as a quantitative one.
Problem – suspected under use of the new CRM system because some processes may have been inadvertently duplicated within the vestigial manual elements from the old system.
Target – increased effectiveness centred on full use of the CRM system
Outcome – list and rationale for the removal of suspected redundant processes
Actor – area managers
Activity and Data Spotlight – to assess (activity) the impact of effectively duplicate processes (spotlight) on the overall operation of the CRM systems in relation to potential cost saving.
Research Question – What (interrogative) rationale (outcome) can be found for the removal effectively redundant manual processes (problem) which can be used by area managers to reconfigure their CRM systems to increase its effectiveness and hence raise business productivity and reduce costs (target) by a assessment of the impact of suspected redundant processes on work flows (spotlight).
Research Method – there are expected to many processes involved and it seems appropriate here to use case studies because I need to understand why these duplicate processes co-exist.
Collection Protocol – document search to obtain the processes followed up by observation of the process assisted by interviews .
Pre-processing – the various duplicate or almost duplicate processes with classified into a list by their expected impact on overall system efficiency using a standard model based on the factors: utility, process cost, training commitment,
Outcome Processing – to obtain the outcome of a list and rationale for the removal suspected redundant processes that can be removed from the system each process will be reviewed by a seminar panel of relevant managers. This outcome will then be used by area managers to decide what vestigial processes can safely be removed without affecting company throughput and in this way generate the target of increased effectiveness centred on the full use of the new CRM system.

Catalogue - This means to create an ordered collection of some sort where there is a logical order and the essence of the task is to enumerate and describe
Problem – variable tele-worker productivity in software development
Target – assured worker productivity levels
Outcome – worker stress report
Actor – product project managers
Activity and Data Spotlight – to catalogue (activity) the stress effects imposed on tele-workers (spotlight) in a fast moving software development market.....
Research Question – How can (interrogative) managers gain assured productivity levels (problem and target) from tele-workers in software projects (spotlight) by commissioning a stress report (outcome) which will later be used by product project managers (actors) to plan an effective and balanced work schedule.
Research Method – here I want to explore this area so I am going to focus on Biographies and trace worker activities.
Collection Protocol - a questionnaire will be used to look for interesting or unusual candidates to interview and trace their CV and work activities by means of a form of document searching .
Pre-processing – the interview and document data be processed using common text processing ideas to classify and prioritise the main stress effects and presented as standardised short biographies .
Outcome processing – based on the biographies a worker stress report will be prepared for management with an assessment of possible productivity impacts. This outcome will then be used by product project managers to balance workloads based on the various stress factors uncovered in the report and hence generate the target of assured worker productivity level.

Collect - This is very simple as all one does is to identify the data and literally collect it as you see it. So if I were looking for SPAM instances then as soon as I find one I just file the whole SPAM email away for later processing.
Problem – customer complaints about delays in resolving problem via the help desk
Target –
Outcome –
Actor –
Activity and Data Spotlight – will be based on collecting (activity) help desk work requests and their associated actions (spotlight) that have been delayed for more the 48 hours...
Research Question –
Research Method – this is a potentially large population so for practical reasons I will use the survey format as I feel I am mainly trying to describe this situation.
Collection Protocol – effectively the protocol is document searching where we one extract the above information from the help desk log.
Pre-processing – classify the work requests into a prioritised list by: operative, system and action with a final assessment by the relevant manager of the main cause of the delay.
Outcome processing – the prioritised list will be used to generate an action plan to deal with identified common causes of delay with a view to revising the current help desk work model. This outcome will then be used by the systems team to focus the help-desk re-building process and hence it is hoped generate the target of a more efficient and reliable service.

Compare - Look for similarities between one or more things.
Problem - apparent mismatches between company needs and programming staff recruited
Target –
Outcome –
Actor –
Activity and Data Spotlight – to compare (activity) IT recruitment guidelines with current company tasks (spotlight) and their implementations
Research Question –
Research Method – since this is largely looking at what might be called historical data it seems worthwhile to use histories as the most suitable method
Collection Protocol – the essential task here is by a process of document searching as one compares the existing guidelines with the defined task specifications.
Pre-processing – none as a suitable list may be constructed at the collection stage by just using the guideline indices.
Outcome processing – the list will be processed to obtain a set of recommendations on a revised set of guidelines that better reflect company needs as found in the required tasks. The principle processing mechanism will be to use the existing task cost structures and the company staffing policy to arrive at the new guidelines . This outcome will then be used by team leaders and heads of department to focus their staffing needs in software development into an accurate and lucid job descriptions and hence generate the target of reduced recruitment costs and accurate selection of new staff to fit the required job profiles.

Compile – similar to list but here the implications is your are searching many sources and having to make decisions in the process
Problem -
Target –
Outcome –
Actor –
Activity and Data Spotlight – to compile (activity)
Research Question –
Research Method –
Collection Protocol –
Pre-processing –
Outcome processing –

Contrast - Look for differences between one or more things.
Problem - apparent mismatches between company needs and programming staff recruited
Target –
Outcome –
Actor –
Activity and Data Spotlight – to contrast (activity) IT re recruitment guidelines with current company tasks (spotlight)
Research Question –
Research Method - since this is largely looking at what might be called historical data it seems worthwhile to use histories as the most suitable method
Collection Protocol – the essential task here is by a process of document searching as one contrast the existing guidelines with the defined task specifications.
Pre-processing – none as a suitable list may be constructed at the collection stage by just using the guideline indices.
Outcome processing – the list will be processed to obtain a set of recommendations on a revised set of guidelines that better reflect company needs as found in the required tasks. The principle processing mechanism will be to use the existing task cost structures and the company staffing policy to arrive at the new guidelines. This outcome will then be used by team leaders and heads of department to focus their staffing needs in software development into an accurate and lucid job description and hence generate the target of reduced recruitment costs and accurate selection of new staff to fit the required job profiles.

Criticise - Make a judgement, backed by a discussion of the evidence or reasoning involved, about the merits of theories, opinions,...
Problem – apparent bottlenecks in the repayment system causing customer complaints and miss-payments
Target –
Outcome –
Actor –
Activity and Data Spotlight – to form a critique (activity) of each stage of the current repayment work flow (spotlight) with regard to IT usage....
Research Question –
Research Method – as my main aim here is to improve the flow in some way I have decided to use Action Research
Collection Protocol – observation based on the workflow definitions will be the main collection vehicle here.
Pre-Processing – this will look for outliers and clusters in the critique summaries and form them into a matrix in a prioritised order.
Outcome Processing – this will be in two stages. The first stage will look at outliers as they are normally indicative of underlying problems themes. The second stage will look at clusters as this implies similarity and that may point to where future IT deployments may best be sited. These two sections will then be used to generate the outcome of a set of process cycle synthetic metrics that can be used by finance managers to continually monitor the repayment cycle in the future and hence generate the target of functional repayment cycle which is reliable and verifiable

Define - State the exact meaning you are attaching to a word, phrase, idea, process etc
Problem – apparent transaction losses
Target –
Outcome –
Actor –
Activity and Data Spotlight – to define (activity) the state of each logged transaction within the scope of the current network transmission protocol (spotlight)
Research Question –
Research Method – this study will look at a large number of transactions and the essential method is therefore a survey
Collection Protocol – transactions data will be extracted automatically from the log by means of a software application. The software will also tag the various transaction types according to metrics defined in the literature to form a matrix of transaction definitions.
Pre-Processing – none as a structured collection will be available via the automate collection stage
Outcome Processing – the processing will automatically scale the data and display it in graphical form and of particular interest is transactions that might be regarded as outliers as they may be anomalous and point to processing sequences or other error types. Once the outliers are known it will be possible to produce as an outcome a report on verifiable metrics that can be used by monitoring software to predict which transactions are likely to cause process cycle difficulties and hence remedies can be sought in order to achieve the target of reduced transaction losses.

Describe - This may be used freely to describe in detail situations, events, opinions, feelings and so on.
Problem – lack of trust in security checking
Target –
Outcome –
Actor –
Activity and Data Spotlight – to describe (activity) differences in network penetration test results carried out over several test periods (spotlight).
Research Question –
Research Method – since we are essentially looking at historical data the method of histories will be used
Collection Protocol – document searching coupled with interview with systems administrators
Pre-Processing – the various discrepancies uncovered will be classified into severity levels and presented in a list format with administrator comments and a description of why it might have been missed on the previous test cycle.
Outcome Processing – Using the structured primary data set and the standard workflow model used in the testing suite attempts will be made to identify test scope factors that may have allowed faults to be overlooked and hence expose the network to unnecessary risk and hence generate the outcome of a revised scope of work and workflow model . This outcome will then be used by the outsourced security company team to adjust their testing suite so as to achieve the target of a security assured network.

Differentiate - Look for elements that would clearly differentiate between two or more things
Problem – poor IT utilization amongst middle level managers
Target –
Outcome –
Actor –
Activity and Data Spotlight – to explore the cultural milieu in which managers of an organisation exist by differentiating (activity) various cultural elements (spotlight) that are present.
Research Question –
Research Method – in this I feel I need to immerse myself in the day to day life of managers in order to understand how that milieu might point to how IT training might be used by them and this makes me think of the research method of Ethnography .
Collection Protocol – this is a slightly sensitive area so it seem best to use observation based on spending long sessions within the managers department coupled with informal interviews
Pre-Processing – the raw primary data will be in the form of a mixture of short and long notes plus some formal interview transcripts as well as some video and photographic information. With the rich information base an attempt will be made to extract typical ethnographic elements such as: behaviours, structures, functions, roles, politics and communication styles. The extracted data will be carefully organised into a concordance within these categories.
Outcome Processing – using the structured primary data collection I will attempt to match cultural themes found within a manager's department with a training mode that might be best suited for that culture. The basis of the matching will be to use the 5 stage learning model developed by Garlick (1999) so that in essence we link learning progression to its cultural suitability. The outcome will be presented as an IT training plan and used by the manager's forum to adjust their personal training portfolio so as to achieve the target of higher IT utilization leading to more effective middle level management.

Discuss - Explain something by giving two sides of the argument
Problem – non IT personnel are reluctant to engage in computer user training
Target –
Outcome –
Actor –
Activity and Data Spotlight – to discuss (activity) the function of IT training for non-IT personnel (spotlight).
Research Question –
Research Method – this is essentially exploratory and it therefore seems best given the wide diversity of opinion that is likely to emerge to use the survey method.
Collection Protocol – a presentation will be made in seminar sessions and this will be followed by open discussion . Although this is a survey I have chosen this method as I want it to be a learning experience for all involved as well so in effect I will be looking to see if the seminar assists in forming opinions.
Pre-Processing – the seminar discussion notes will be structures by looking for the usual text processing elements such as: common threads, outliers, labelling, etc and formed into a catalogue .
Outcome Processing – the outcome is to be a position paper outlining a new training initiative and this will be generated by looking at the elements identified in pre-processing and knowing these have emerged from a sample the attempt will be made to say what it might mean for the whole company - can it apply to the whole company, is there some important element in this theme that has much wider implications, is there a principle that can be established, can I construct a theory and so on. The position paper outcome will be presented to company and training management with a view to informing them of the general feelings and desires of the wider non-IT workforce so that the target of construction of future training plans and personal training portfolios that better fit with worker needs and aspirations

Evaluate - In some cases one might want to look at events or people or processes in order to form an evaluation and that collection of (usually) small evaluations form our primary data.
Problem – unemployed people's disappointment in their inability to locate an appropriate job
Target –
Outcome –
Actor –
Activity and Data Spotlight – to evaluate (activity) the elements functioning negatively and positively in job searches (spotlight).
Research Question –
Research Method – I am looking for the various factors that might be involved in job searching. Many of these will of course be well known such as qualification or skills but there may be many other that are not so obvious such as ethnicity, age, sexual orientation to name but a few. With this in mind I intend to explore this area looking for suitable illustrations of these factors and how they acted negatively or positively with regard to obtaining employment and so I feel the method of Vignettes is most likely to be valuable here.
Collection Protocol - My procedure will be to interview jobless 18-25 year olds (plenty can be found in job centres) in a defined inner city to collect illustrations of successful and unsuccessful job searches.
Pre-Processing – the interview transcripts will contain what amounts to suitable illustrations so these will be extracted and standardised based on a simple job seeker profile into a portfolio of successful and unsuccessful job searches illustrations.
Outcome Processing – using the illustration portfolio a protocol will be devised that when coupled with a standard job seekers profile can be used to enhance a web search for suitable employment opportunities. The outcome of a protocol and linked profile will be made available to job seekers and web job search system providers in order that the target of effective and satisfying web searches can be achieved.

Examine - Look carefully at the details of an argument, theory, or plan etc
Problem – frustration at the apparent time wasted on electronic correspondence
Target –
Outcome –
Actor –
Activity and Data Spotlight - to examine (activity) the various activities involved in the electronic correspondence process (spotlight) such as e-mail, fax, documents, photos, electronic forms, document and imaging process, accessing of images, routing/delegation functions according to the work flow process.
Research Question –
Research Method – there are several main areas and I need to form a clear understanding of the various technologies and processes so I will use the method of case studies and treat each communication area as a case study.
Collection Protocol – in this study I want to collect various communications samples and the practices associated with them in several areas and it seem best to do this by a series of observations and interviews with selected personnel from various levels in the company.
Pre-Processing – the collection phase will generate a large raw data set consisting of artefacts (samples provided in the interviews) and activity descriptions. It seems best therefore to organise these into a communication area/activity matrix linked to an artefact sample catalogue .
Outcome Processing – I think it best to process the matrix and catalogue to derive some suggested best practice description in the various areas and then by means of focus groups arrive at agreement on what can be called best practice and hence construct an outcome of a best practice portfolio in electronic communication and this can be used by individuals and training management to help ensure the target of communication being viable, efficient and satisfying to participants.

Explain - this is about saying why something is. So one can describe an event but also explain why it occurred
Problem – serious concerns in some departments over impacts on working practices of a proposed new land registry application
Target –
Outcome –
Actor –
Activity and Data Spotlight – to explain (activity) possible impact effects of a new land registry application system and database (spotlight) in common areas such as: cost, performance, user acceptance, etc
Research Question –
Research Method – the suggested method here is an extended survey as the system itself is quite extensive
Collection Protocol – there will be three main mechanism: document searching to establish expected benefits and then observations and focus groups to establish the consequences in the various areas
Pre-Processing – the observations and focus group information will be compiled under various headings using a standardised format and catalogued but will in large part be based on the companies stress model as the main aim here is to assess impacts but largely those will be people based impacts. The chosen method is to draw one or more Rich Pictures based on the catalogued information so that various perceptions can be shared and as a final step carry out another focus group where the pictures are examined and discussed.
Outcome Processing – the intended outcome will be generated based on a careful analysis of the catalogue produced in pre-processing. From the catalogue and the final focus group information a comprehensive impact report will be compiled that can be used to assist in planning by management for the implementation of the new system and hence achieve the target of alleviating genuine personnel concerns and preparing the organisation for a smooth transition.

Explore - You can use this word but we are always exploring so it must be used with care. Typically, in these cases one starts with a model of some kind and uses that to inform the exploration process. For example, we might have a theoretical process map and we use it to explore various working processes to see if we can find flaws or weaknesses and then those descriptions of flaws or weaknesses become our primary data.
Problem – loss of market potential for my company
Target –
Outcome –
Actor –
Activity and Data Spotlight – to explore (activity) the company business profile with regard to its fit within the modern global economy and the use of the Internet and eMarketing/eCommerce (spotlight)
Research Question –
Research Method – this is exploratory and in this case it seems best to think of the whole company as one case study area and the need to clearly understand its business profile.
Collection Protocol – there is potentially a lot of information here and it might be in diverse places including just in people's minds so it seems best to use interviewing coupled with document searching and then follow this up by seminar sessions to share perceptions via Rich Pictures.
Pre-Processing – The various interview transcripts and document extracts will be examined using normal text processing ideas to produce a detailed company business description (products, policies, structure, finance, Issues, IT infrastructure, etc) supplemented by feedback from the seminar sessions.
Outcome Processing – armed with the full business description and Rich Pictures there will be an open discussion with consultants about creating an outcome of a business case for an eMarketing/eCommerce outlet with the target of increasing the company's market potential based on using Porter's 5 forces model as a starting point.

Illustrate – Here one is trying to find a way to express in a very pointed way some situation or thing. So one might identify an instance of SPAM and then illustrate why it might be harmful so adding poignancy to the example you have extracted. Mostly, it is best to think of illustration as a way of giving an example but in that example you want to make just one clear point.
Problem – expressed dissatisfaction with the quality of delivery within a training organisation
Target –
Outcome –
Actor –
Activity and Data Spotlight – to illustrate (activity) how a student's acceptance and satisfaction in a training course (spotlight) are affected by the various technologies that might be used.
Research Question –
Research Method – this is a new area and I am not sure what sort of things will emerge so it is therefore largely an exploratory study and since I am aiming to find various factors that might be significant I think the Vignettes method is the most appropriate.
Collection Protocol – in this case I am looking for examples or illustrations of the various factors in action. It therefore seems appropriate to use both interview and observations of participation activities that occur during training.
Pre-Processing – the raw primary data will be in the form of simple illustrations of training activities and an assessment of the technology effects that were observed. This raw data will be processed to find a common catalogue of illustrations that explain technology acceptance and satisfaction levels and each illustration will effectively define a training factor.
Outcome Processing – using the catalogue of illustration and named factors a training model will be constructed that maximises both satisfaction and acceptance. This will be accomplished by using the standard model features and outline course learning objectives. The outcome will be used by trainers to re-model all course offerings and hence achieve the target of higher satisfaction levels in our course provision.

Interpret - The essence here is that one is typically observing something to describe it but also to find some meaning in what is being done. This is often used when looking at social groups or situations where it is not always obvious why certain actions occur
Problem – getting more value out of POS systems
Target –
Outcome –
Actor –
Activity and Data Spotlight – to be based on interpreting (activity) customer responses to kiosk/POS implementations (spotlight).
Research Question –
Research Method – given the large number of potential sample points here it seems obvious that a survey is the only feasible choice
Collection Protocol – the protocol will be a survey of customers by means of interviews to obtain data such as average age of buyer, degree of satisfaction, service speed etc. To balance this I will also obtain from the client such things as increase in perceived business value, improvements in customer relations, kiosk usage statistics etc.
Pre-Processing – the interview data will be processed using the usual text processing methods with some simple statistics and all this data will be structured into a matrix with the various factors identified during text processing – one matrix from a customer viewpoint and another from the retailer viewpoint.
Outcome Processing – once the matrices and statistics are available I will construct a report on the efficacy of this enhanced form of POS using the PESTLE (Political, Economic, Sociological, Technological, Legal and Environmental) model of analysis. This report will be useful to managers contemplating this technology as it may help in pinpointing what conditions within the market place must exist for it to be successful and hence lead to the target of getting more return on the POS systems.

Justify - Show adequate grounds for decisions and conclusions and answer the main objections likely to be made about them.
Problem – suggested productivity gains in upgrading to MS vista
Target –
Outcome –
Actor –
Activity and Data Spotlight – to attempt to justify (activity) a new function set (spotlight) based in expected productivity gains
Research Question –
Research Method – my basic aim here is to indicate (it is not possible to prove) the viability of productivity gains from an upgrade to Vista. It follows, that the essential method here is my means of Quasi-experiments because it is not feasible to install Vista on the live environment since that would imply the decision to upgrade has effectively been made. It follows that for testing to be feasible any possibly justifications must be made in a simulated environment.
Collection Protocol – the means here is simple data recording based on a series of Vista function tests. To carry out the tests a series of known common tasks will be formulated covering general topics such as searching, surfing, organisation (of directories and files), ..., and products based on covering Word, Excel and PowerPoint. The process will be to use the series of common tasks as part of a training exercise in Vista with several staff recruited to carry this out. The recorded data will be exercise timings, accuracy achieved and a reflective diary kept by each participant coupled with the participant and observed function justification (why it might be useful or more useful than that available currently)
Pre-processing – this will classify all functions tested and with various statistical calculations attached. The reflective diaries will be scanned for pertinent comments on each function. This will be structured into a catalogued report ordered by function.
Outcome processing – the catalogued justification report will be analysed from three viewpoints: the first will be utility (how well did the function perform), likeability (how well was it received by participants) and potential cost benefits in terms of productivity in order to generate a careful review and recommendation to management. This outcome can then be used to gain the target of an informed management on the expected gains/losses of the proposed upgrade.

Link - This is often a neat way of dealing with some types of data where you think there is a relation but the relation itself is not known with any certainty. One often finds this kind of activity evidences in a matrix formulation or representation.
Problem – inappropriate user behaviour in the use of their work based PC systems and networks leading to various undesirable side effect such as loss of bandwidth, virus infection, risk exposure etc.
Target –
Outcome –
Actor –
Activity and Data Spotlight – to link (activity) a security violation with a particular user behaviour (spotlight) - that will generate a primary data item (implicit here is that we also need a description of each violation and user behaviour).
Research Question –
Research Method – the basic method here is to use a survey instrument as these inappropriate user behaviours are thought to be widespread in the organisation and there is therefore a need to explain these actions.
Collection Protocol – search and extract violations descriptions from the log using a text processing tool. This is a sensitive area and one is unlikely to get good data by any direct means. However, interviews will be used to explore user behaviours in general.
Pre-processing – the violation descriptions will be examined in a seminar with experts to establish the behaviours that caused the violation. To do this a matrix of violations linked to user behaviour is formed with a violation severity rating based on violation extent: local to department, local to PC, local to a particular system, local to the intranet or global to the company. The interview transcripts will be summarised using normal document extraction methods and presented in tabular form to inform seminar participants
Outcome Processing - I need no to use the prioritised matrix to develop a security policy . Therefore I might search for an appropriate BS to guide me in the process or I might use a method called PLOT – but whatever I use it has to be such that it can be repeated by another person. The whole purpose of the process is that I can then draw up a policy that might help us achieve the target of eliminating or at least reducing these inappropriate user behaviours. The outcome will be presented to management for approval and then implemented by the IT department with appropriate training and technological means.

Outline - Give the main feature or principles of an object, omitting minor details and emphasising structure and arrangement
Problem - IT services migration time overruns
Target –
Outcome –
Actor –
Activity and Data Spotlight – to outline (activity) an engineer’s activity for each migration service (spotlight).
Research Question –
Research Method – this study examines past records of migration activities and it is about understanding them and the services they support so it seems best to think of this as case study but based on historic data with a number of migrations examined.
Collection Protocol – the main protocol is document searching to extract the necessary data via online status reports and these may be supplemented by interviews with engineers and/or the service providers.
Pre-processing - Once I have collected my primary data I will structure it as a categorized table with engineer activity and migration services noting cases where migration delays occurred. The table will be organised on a key activity idea where these key activities have been established by an examination of the project plan.
Outcome processing – a migration model will be used to process the categorized table to develop an optimised strategy for project control of key migration activities and used by project managers to get the target of reducing migration project overruns.

Portray - This might be a useful verb if you were looking for types in a study. For example, if you were looking for people who get involved in illegal downloads one might want to portray them in some way.
Problem – SPAM is junk mail and leads to high loading on infrastructures but this study will focus on the increasing level of complaints from users ranging from simple irritation to exceeded mail box quota lock-outs.
Target –
Outcome –
Actor –
Activity and Data Spotlight – to portray (activity) SPAM instances (spotlight) by extracting messages from various server logs.
Research Question –
Research Method – methods of SPAM prevention are well known and for this study to be interesting it needs to uncover something new that might help in the SPAM elimination battle. One such element might be to portray various kinds of SPAM perpetrators and to this end the study will explore SPAM messages in order to discover these portraits and so it seem best to use the idea of Vignettes
Collection Protocol – since we need to look at messages there is an inherent risk that they also carry elements such as a virus of some kind which opening the message might trigger. For this reason the SPAM message data will be extracted electronically using a tool which I will build so that the data can be examined in a secure environment.
Pre-processing – messages will be examined for common structural features such as: header, topic, sender, method of reply etc - to build up profiles of a typical SPAM message types. Once the profiles are available each message will be standardised and then presented as a catalogue . Using the catalogue a second stage of pre-processing will examine each standardised message to profile each message element: header, address, body and so on and that additional information will be added to the catalogue. The principal mechanism used here in this standardising process is the usual text processing ideas of looking for key words, labels and so on.
Outcome processing – using the SPAM message catalogue and element profiles the Cambridge profile model will be used to portray senders: introduction, personal needs, interests, skills, comparison with other similar profiles, message and profile match, conflicting indicators and message offering. These portrayals will be placed in a catalogue of SPAM perpetrators with commentary and used to get the target of informed users and also used by system managers as a guide to building SPAM secure systems.

Profile - This is similar to a description but it focuses on just the key points. For example, if we were looking for best practice in a situation then we might start by just profiling a given task – that is we outline the main steps and rationale to start with. The idea is similar to an outline but implies deliberate selection of certain aspects.
Problem – high levels of dissatisfaction with the very low revenues achieved through College fund raising activities
Target –
Outcome –
Actor –
Activity and Data Spotlight – to profile (activity) donors' giving habit/pattern/background and their associated publicity strategies (spotlight).
Research Question –
Research Method – in this case there are a large number of donors and the whole purpose here is to try explore what it is that drives them in their giving. It therefore seems sensible to use Vignettes as the most useful research model to use here because good and bad examples will aid in the exploration process.
Collection Protocol - Semi-structured interviews will be an effective vehicle to collect this data as it is of a sensitive nature. Preparation for these interviews will be by means on an analysis of donation records together with an examination of past publicity strategies.
Pre-processing – the interview transcripts will be pre-processed using the usual text processing ideas such as: labels, common themes, outliers, etc and from this the various illustrations will be constructed and formed into a PowerPoint Presentation
Outcome processing - the PowerPoint presentation will be used in a conference for senior managers to review/assess the fund raising illustrations. The conference will be split into groups, each group presenting its review findings at the close of the day and from this a position paper outlining a new strategic options generation framework with recommendations for an associated IT infrastructure will be generated. The process used to generate the framework will be a simple input/output model with the usual elements of performance, procedures, inputs/outputs, facilities and equipment and finally required skills and knowledge. The options framework can be used to derive IT supported fund raising initiatives the target of increased and assured College funding.

Represent - Sometimes you might plan to build a representation of some event as you primary data. For instance, if one was looking for security awareness in employees then of course one cannot "see" it or collect it as such. In these cases we must try to find a way of representing an awareness level or feeling and that representation forms our data.
Problem - management uncertainties and confidence regarding the proposed implementation of an EDM system.
Target –
Outcome –
Actor –
Activity and Data Spotlight – to represent (activity) the way information is managed (spotlight) currently being conscious that it may exist, be stored in, captured/archived and accessed in many forms including paper, microfilm, microfiche, tapes and CD.
Research Question –
Research Method – I need to get a close understanding of the document management issues and it seems therefore best to use case study approach here where I will think of each case as typified by an information medium. The study here will be by means of a light touch as I am not trying to gather requirement but only a representation of practices.
Collection Protocol – I anticipate that most of the document management practices are not available in written form consistently anywhere and I see no alternative but to use an observation and interview protocol in order to elicit the representations I need.
Pre-processing – using the observation and linked interview transcripts I will construct a catalogue of standardised representations of document management practices. The process itself will be to use the idea of best practice to form each standardised representation using: definition, control structures, design, distribution, accessibility, security classification, content type, associated policy/rules, status (contractual, regulatory etc) and issuing authority.
Outcome processing – I will use a type of spin-off model to asses probable impacts from which uncertainties may be gauged and hence confidence increased. I particular a modified form of the HAL Technology Impact Model with 4 elements: sponsoring agency, contractual, users, and other linked technology products. Using this simple model I should be able to use the catalogue of representations to asses what activities will need sponsorship, what activities will be spin-offs and where activities may be defused or unclear. Bases on the above assessment a report will be prepared to ensure the target of an informed and aware management board regarding the possible impacts in order that any new technology can be implemented with minimum disruption.

Summarise - Give a concise and lucid explanation or account of something, presenting the chief factors and omitting minor details and examples
Problem - over exposure of the corporation's data assets which may lead to data theft and increase reputation loss risk.
Target –
Outcome –
Actor –
Activity and Data Spotlight – to summarise (activity) the corporation's data assets (spotlight) by defining their value, criticality, sensitivity and legal implications.
Research Question –
Research Method - this research will solicit information on the data asset types, risk ratings and legal implications from the data owners and legal department so the use of surveys will facilitate the timely and standardized collection of this data.
Collection Protocol - Document Searching of recently completed Risk Reports for data value coupled with the use of interview scripts to define data, its criticality and sensitivity and to determine legal implications.
Pre-processing – The primary data will be scanned to complete a grid showing data types by sensitivity, legal requirements, reputation and other risk
Outcome processing - The data classification grid will be used to determine access permissions appropriate to a particular information asset based on an asset owner's assessment and be the basis for a data classification guideline for the Corporation's data assets protocol . The protocol will be used in corporate governance to gain the target of assured information assets.

Synthesise - Resolve something into a whole from its component part.
Problem – there is a concern that provision of IT services is not aligned with strategic organisational goals.
Target –
Outcome –
Actor –
Activity and Data Spotlight – to synthesise (activity) the various aspects of IT service delivery (spotlight) by examining delivered services to see what practices are involved.
Research Question –
Research Method – in this case I need to gain a thorough understanding of service delivery but at this stage I regard it as relatively unknown and exploration is needed and so it seems best to use the Vignette method to look for delivery exemplars or their opposite.
Collection Protocol – essentially this is about business performance issues and how performance is assured in part at least by IT service. With this backdrop in mind I will use interviewing to trace various IT services and their outworking and effects in business units. For this to be successful it will be necessary to obtain a list and description from the IT department beforehand of the various IT services commonly used in the organisation that might be regarded as business critical.
Pre-processing – based on interview transcripts I will extract perceived uses and needs and match this to the service definitions provide by the IT department. The collection of data will be expressed in matrix form and prioritised by a consideration of its essentiality to business but each entry will be a service delivery exemplar (positive or negative).
Outcome processing – using the list of exemplars I will use the ITIL service delivery model and a goal alignment model to recommend changes to the current practices so that IT service delivery matches needs so that IT managers can use it to get to the target of IT service goals being more strongly aligned with business goals.

Some of you seem to be getting their ideas in a muddle because they are striving to PROOVE something. In Research proving something is extremely difficult at the best of times and some things are impossible to prove. Writers going right back to the earliest times have grappled with the idea of proof and you will find the philosophical literature packed with books and articles on this one idea. We will be simple about it and start with the two, perhaps, main strands of thought: inductive and deductive reasoning.

Cause and Effect

It is as well when you read these notes to remember that everything one way or another has a cause. So if your accounting system malfunctions then there is cause or really a train of causes and effects: first effect is data input routine fails - cause of input routine failure programming error, causes of programming error is a mistake in the specification and so on.

Don't run away with this idea as in life there are many, many things where we can see the effects but have no chance of knowing the cause for certain: someone crashes into your car, you lose your wallet, you get short sighted and so on.

Research therefore is often at its root about seeing an effect and then looking for a cause. Once we know the cause we try to create something that we can use to remove the cause and so get rid of the effect we don't want by creating an effect we do want. For example, suppose the effect we see is misuse of IT resources for personal use (that is the effect we don't want) and let us for simplicity say that it is caused by people not knowing the rules of use so we can remedy this situation by creating a set of rules or a policy for IT usage and then when the rules or policy are used say by departmental managers we get rid of misuse (the effect we don't want) and instead we have productive use (the effect we do want).

It perhaps is worth noting here that we need two things: the outcome (rules/policy) and the actor (departmental manager) and that linking of outcome and actor will always be present.

Induction

This just means the inference of a general law from the observations of particular instances or sets of instances. What this means is that you notice something that happens and see that it happens often. It follows that you can infer or guess a general law from your observations. For example, you notice that people in your company tend to be more productive after IT training so you make a generalisation using induction and say "training in IT leads to personal productivity increase".

It is very important you understand that nothing has been proved here and all you have is an indication. It is not a proof because we cannot know what new IT tasks or technologies might occur in the future. One of the greatest modern philosophers, Popper, put it like this. "You can never accurately predict the future because it is impossible for men to know now what they, or others men, will know in the future". It follows that we are never possessed of the data that can allow us to make certain predictions about what may lie over the horizon based on our current stock of knowledge no matter how certain we feel about it.

Deduction

This just means inferring particular instances from a general law. So if for example we use Ohm's law we can predict with certainty the value of current if we know the resistance and voltage applied to a particular circuit.

In research we might think along either of these lines so for example we often set a hypothesis (a guess at general law) and then try to prove it. Alternatively we can go and collect data and by looking at the data see if we can work out what the law involved might be.

So if I were considering a link between personal productivity and IT training then I might take a deductive line and postulate the hypothesis (law if you like) "training always increases personal productivity" or I could take an inductive stance and just collect data and see if I can see (guess) what the "law" might be.

Comment on Induction and Deduction

There is no right and wrong approach here and it's a matter for you to consider what sort of outlook you are taking. Probably in technology we tend to take a more inductive attitude. Now it all may sound simple in the IT training case I mentioned above because using either stance one would collect more or less the same data but it will not always be that simple – for example supposed you were looking at the effects of IT system migration in a rapidly expanding company and project control methods used to manage it then it is now not obvious at all what the link between these two things might be so a deductive stance would be unsuitable here.

You might like to think of Sherlock Holmes the fictional detective of the Victorian era who was famous for making deductions. In one story called "The Cardboard Box" he visits a client and sees a photograph on the wall and deduces that the client has two sisters. If you like he used a general law: people have sisters and he uses that general law to deduce a particular instance of it: that his client has sisters. Notice here that such a deduction would not always be true but would be always reasonable.

You might further notice that this is not induction. It might look like it in that the photograph looks like data on which we might guess at some general law. This is not so however, since one cannot look at a photograph of three people and infer a law from it about sisters. Logically, we can say that many or most women have sisters therefore a particular woman probably has one. However, we cannot say a particular woman has a sister therefore all women have sisters. To put it more simply, we can say that if all boys are bad and Fred is a boy, therefore Fred is bad. But it is obvious we cannot say Fred is a bad boy therefore all boys are bad. In summary we cannot argue from the particular to the universal but we can argue from the Universal to the particular.

Proof

This means that the phenomenon we are looking at is always true. Now, in practice, proof might be constrained or unconstrained. For example Archimedes principle is unconstrained, meaning it is always true for everyone, all the time, everywhere and is accepted by all. But if we set up an experiment to try to prove that Google email is efficient – it will be constrained in that it is obvious that it is very unlikely to be true for everyone, all the time, everywhere and is accepted as true by everyone. In fact in this case it is severely constrained in that even if you managed to show statistically that it was true then at best one could only say that it applies to the sample used in the study. Additionally, using Poppers idea mentioned above it is obvious we cannot know what will happen in the future.

Notice that I say above that one characteristic of proof is that it is accepted by all but you would be surprised how often that is ignored. Just one ludicrous example will illustrate this, a student told me a story (it may be apocryphal) about an aged Saudi Arabian cleric who in 1977 issued a fatwa (a ruling) that the world was flat! So don't be surprised if people disagree with you even when the evidence seems overwhelming.

Indicators

This is where we talk about indicators - that is in the email study we might be deductive and infer or indicate that Google email is likely to be efficient for most users – that is indicators are not proof but generalisations made on the basis of some evidence (data) we might have. Think of it like this – suppose you invented a wonder pill that you claim would make you see in the dark. Now proving that it works for everyone, all the time and everywhere means that YOU are prepared to guarantee it is true. If it later turns out that for ME it did not work when I was driving my car at night and I ended up crashing and killing 40 goats, 2 chickens, a pedestrian and an onion salesman then I will sue you for £100M!

On the other hand we can be constrained and think in an inductive manner and say that "it has been shown to work in many cases" – that is all we are prepared to give is an indicator (a generalisation) because we have some evidence that it works but not a cast iron guarantee. You might like to link this idea of constrained to setting confidence intervals in statistics.

Sophistry

Much that you will read on the internet in particular can only be classed as sophistry that is clever but worthless argument. The Sophists arose as philosophers more or less at the same time as Socrates in ancient Greece and felt themselves to be very wise men who knew everything in contrast to Socrates who claimed he knew nothing. The Sophists it seems were not much interested in truth but only in winning an argument and many believe they in effect sowed the seeds of the demise of the Greek nation at that time. This may all have happened 2,500 years ago but their legacy lives on and the corrosive influences of their attitude is evident everywhere today and certainly in politics and religion.

As it happens I was discussing these ideas with a student a few days ago in this cohort and she pointed me to a site written by Dr Gary Miller. Dr Miller invites us to use his materials freely so I will do that to illustrate several things about proof. On this site he wrote many things which he regards are some sort of proof and he says it is possible to set standards for truth and talks about falsification tests. Here is one example of the kind of argument he uses.

(http://www.islamicinvitationcentre.com/articles/gary_miller/quran/Quran.htm#Intro)

An engineer at the University of Toronto who was interested in psychology and who had read something on it, conducted researched wrote a thesis on Efficiency of Group Discussions. The

purpose of his research was to find out how much people accomplish when they get together to talk in groups of two, three, ten, etc. The graph of his findings: people accomplish most when they talk in groups of two. Of course, this discovery was entirely beyond his expectations, but it is very old advice given in the Qur'an: "Say, 'I exhort you to one thing - that you stand for Allah, [assessing the truth] by twos and singly, and then reflect....'"

1. So we must look at this and see whether it can in any way be regarded as proof. We might easily observe straight away that there are no references and it is impossible for us to check what has been said as it's a hopeless task to find "An Engineer at the University..." He quotes the Qur'an but does not tell us the surah or the English translation it is taken from (or did he translate it himself or even just make it up). When you see this kind of extremely poor scholarship one has no alternative but to ignore Dr Miller's work entirely as it cannot be trusted. That does not mean Dr Miller is a bad person, all we are saying is that his work cannot be trusted.

2. You may also note that the quotation from the Qur'an is extremely short and that would make me wonder if he is just being very selective to try to make his own point – that is the quote in full might not support his conjecture so he ignores the bits that don't suit him. Again because we have no references we cannot easily check it.

Also notice that he adds something to the Qur'an "that you stand for Allah, [assessing the truth]" and so he perhaps forces an interpretation on the words "that you stand for Allah" but like any interpretation it is only one of many. Additionally, he assumes that it means assessing the truth of anything and it is almost impossible to see that the actual Qur'anic verses are saying that. Overall this looks like Dr Miller is being tendentious (the author simply wants to convince you of something and may use any means to do it) in the extreme.

3. What is he trying to prove here? That the Qur'an agrees with an Engineer's findings? That the Engineer has verified something the Qur'an has said? Is he offering an interpretation of the Engineer's finding or the Qur'an. We simply don't know for sure what point he is making.

4. It is interesting to note here that if this Engineer or the Qur'an is saying that working in two's is powerful he might like to recall that Socrates made the same observation, which he called his dialectical, with impeccable logic about 2,500 years before the Engineer was even born and about 1,000 years before any copies of the Qur'an existed. If you want to follow this up there is an excellent tape by Mark Forstater called "The Living Wisdom of Socrates", Hodder Headline Audio books which is a very engaging introduction to the teaching and life of Socrates.

This point is quite important and that is why we must read widely otherwise we may well think we have discovered something only to find that it is already known and published and we end up making an ass of ourselves because we have not prepared properly. At worst of course this can also look like plagiarism – to take my example a little further we could argue then that Engineer and the Qur'an both plagiarised the idea of Socrates – but of course we take the obvious solution to be that the Engineer and Prophet Mohammed had no knowledge of Socrates. Whilst we might easily allow that Prophet Mohammed had no knowledge of Greek thinkers (there were no great libraries or the internet 1,400 years ago) we are much less inclined to forgive this Engineer or Dr Miller for not knowing something about Socrates, perhaps the greatest thinker of all time.

In short what this example is saying is that you must be sceptical and careful with what people say and you must ask for evidence. Now of course in everyday life we don't question everything we hear or read otherwise life would be an impossibility but we must always be aware that things may not be what they seem and of course in research and what we read we do need to carefully question what it is because we want to be credible and not make a laughingstock of ourselves.

Ways of Dealing with Proof

There are a number of ways of dealing with this idea of proof and I shall just briefly review them.

Hypothesis

With regard to proof, many students like to write out a hypothesis. There are two stages: write the null and alternative hypothesis and then write down the two (usually) variables involved (dependent and independent variables). Unfortunately these two things are often not done satisfactorily. Let me illustrate.

A student wanted to prove something so he wrote a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (dependent). Now this will ONLY makes

sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified.

Now in research people tend to treat the idea of hypothesis and the notion of proof in two ways:

Formal - to set up an experiment with two samples one exposed to some effect and one not. So just to be simple I could set up a hypothesis based on say those who have been trained and those not and see if there is any difference in their productivity. This is quite complicated and difficult to do. Even then what would it mean if I could show that there was a link – would it be true/false for all time, everyone and everywhere or would it just be true/false for my sample?

Informal - Instead we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies to demonstrate this. Notice that we are NOT proving anything here only indicating/suggesting something might be true.

Setting Standards/Definitions

It is easily acknowledged that in normal life we can almost never get what one might call absolute proof. In courts of law for example they talk about the evidence being "beyond reasonable doubt" or based on "the balance of probabilities" – in other words you get enough information to convince (but not absolutely prove) you of the truth. This may be done in many ways but usually one lists the things one wants to see. For example, if I wanted to prove that Manchester United is the best football team in the world (they are not because everyone knows that is Arsenal!) then I might lay out my standard or definition for proof: no of goals scored, championships won, number of world class players and so on.

There are three problems with this approach: whoever you are talking to has to agree to your standards or definition, if I can prove it today will it still be true tomorrow and once one knows the standards it is all too easy to find the necessary evidence (one might often say manufacture the evidence).

If you want to think more about this you could look at the way Socrates 2,500 years ago uses this idea in his dialogues - one of the most famous was about beauty. Socrates was by all accounts ugly and he entered into debate with Critobulus who was a very handsome man. Socrates simply asked Critobulus what standard or definition of beauty he was using and Critobulus duly offered a definition which on the surface sounds credible. Socrates, then easily proved using the definition that in fact, contrary to popular opinion Socrates was handsome and Critobulus ugly - an obvious absurdity to any observer of beauty!

A vignette may help you here. I came across a true story of a man who had been married for many years but regularly had nightmares as to whether his wife really loved him. He was so bothered by this that he went to see a Church Minister and was told one way (standard/definition) to find proof (evidence) of love was to consider all the little things you wife does for you: wash you shirts, clear you shoes, cook your meals, look after you when you are ill and so on. You can see the "proofs" would be observable but is it really proof, will that man accept the standard or not, will it still be true in a year's time and if the wife knows the standard will she just manufacture the evidence? The fact is that one can never know the answer here absolutely and there will be many things in life that simply cannot be absolutely proved in any rational manner and all that can be done is to feel convinced.

Falsification

This means that a proof is like a chain with links – break one link and the chain fails. So in proof if you can find one contrary example then the proof fails. In life of course it is all too easy to just ignore contrary opinion or examples and go on only looking for supporting ones. No doubt you have come across many people like this (you or I may be one of them!!), no matter what you say to them they refused to be shifted from their own view even when the evidence is there.

Sometime you see this very strong idea distorted. Where you see this is with authors who try to show that X is untrue and then say that Y is therefore true. I am not talking here about a hypothesis because often there is no link at all between X and Y. As you may know from many of my examples, I am a student of ancient manuscripts and one argument I have seen many time is this one. The ancient Bible manuscripts are corrupted – that is over time the original manuscripts have been lost but copies were made but added to, changed and so on. Now it is easy to show that there has been corruption and no serious scholar would think otherwise. Now what many proponents of other religions and humanists have said is because that is true (the manuscripts have become corrupted) then their sacred book or idea is not. The argument is something like "I can show that Ford is a bad car therefore Volkswagen is a good one" or even more starkly, "you are wrong therefore I am right."

Note. Just in case you are worried there are such a large number of Bible manuscripts that it is in fact easy to reconstruct the original autographs. Incidentally, the same arguments have been used about the great Greek writers and Shakespeare.

Just to whet your appetite I might say that scholars who use the ancient manuscripts have what is called a “critical apparatus” or a process if you like for reconstruction of the original. Later I will be introducing you to various critical apparatus that you will be using to process data in your project. In technology we don’t usually say critical apparatus but instead we say Research Method or more simply problem solving method.

Proof by the Unexpected

Most often when we are working on a topic we have an expectation about the answer so that when we actually see it we feel sort of reassured about it. Now, sometimes we can be surprised and startled by an answer because it is just “too good to be true”. If one takes my hobby as an example, whenever an ancient manuscript is found we expected it to be corrupted or contain errors or emendations – why? Because before the days of the printing press it is just about impossible that a scribe could copy a document of any length by hand without making any errors or not being tempted to “correct” the manuscript or “improve” it in some way.

Sometimes the errors were deliberate because someone wanted the manuscript to take on his particular viewpoint or often it was done for gain. Shakespeare was often illegally “simplified” so that copies could be sold in the street or around theatres for profit.

Therefore if any one comes along and says their manuscript is not corrupted we automatically take a very, very sceptical attitude – it is just not credible and one tends to say it is probably a later forgery or at least there must be something wrong with it.

To give a technical example, some years ago I was researching software testing ideas and I had 5 sets of data based on different criteria. Scatter plots were used and the results from set 4 were just “perfect” and I was almost dancing with joy, a bit like Archimedes I wanted to cry out “Eureka” as I thought I had really uncovered a very important principle. However, the results were just “too good to be true” so that scepticism kicked in and I thought I have to check this. Sadly, what I had done was include just one sample point from test sequence 1 into the data for test sequence 4 and that one mistake had biased the results to such an extent that they were worthless.

Proof by Example

Many authors try argument as a way of proof. One often sees this in religion and politics but it is also present in many technical papers we see. The idea is that I present my view on something and then proceed to “prove” it by instancing examples that endorse its truth and often those who use this idea challenge you to find a contrary example.

I rather like this approach but one just needs to be ultra careful that we are not taken in by our own arguments and get to a stage where we just want to keep convincing ourselves that we are right and fail to see weaknesses in our own thinking. When you use this form your logic must be impeccable and you must get evidence that can be checked but always keep in mind that your arguments are almost bound to be constrained. Dr Miller’s page above is a useful one to look at as he rarely uses any sort of consistent logic or evidence and frankly seems to have lost all sense of scope and now sees everything and every example as supporting his own ideas.

Does it Work

It is always very strong when you can show that something works. That is you have a theory and although you perhaps cannot prove it in any absolute sense you can show that it works by citing examples. For example, some project management techniques are like this as we can see them working but if one is sensible one just recommends them as likely to work as no one would be willing to offer a guarantee that they always work no matter what the circumstances or project.

Reading

Monk, R and Raphael, F (ed), (2000), *The Great Philosophers* published, Phoenix ISBN 0-75381-136-7



A Simple, Effective Time Management System

1. Getting the big picture: The semester calendar

This provides an overview of the semester. Fill in all significant events and due dates. This includes: papers, exams, presentations, organizational meetings, job or internship interviews, etc...

Filling in this information will give you a sense of when the “crunch” times are likely to be, allowing you to plan ahead. It will also ensure that you know when papers are due, the dates of exams, and when major projects are due.

2. Knowing your schedule: The weekly calendar

a) Determine the hours of the day that are not flexible or available for work. Write these down on the weekly calendar.

- class times, meetings, standing appointments
- eating, sleeping, exercising
- work, organizations, church, volunteer activities
- family time, social time

b) Determine how many hours each class takes in study / preparation time. List each class and estimate how many hours you need to devote each week (a good rule of thumb is to allow for 2-3 hours outside of class for every 1 hour spent in class).

Class _____ Hours/week _____

Class _____ Hours/week _____

Class _____ Hours/week _____

Class _____ Hours/week _____

c) Now begin filling in the available study time until you have accounted for all of the hours you estimated for each class. Keep in mind the principles of time management on the previous page, and create a weekly schedule for yourself.

Semester Calendar

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Jan. 22							
Jan. 29							
Feb. 5							
Feb. 12							
Feb. 19							
Feb. 26							
March 5							
March 12							
March 19	<div> <div>←</div> <div>SPRING BREAK</div> <div>→</div> </div>						
March 26							
April 2							
April 9							
April 16							
April 23							
April 30							
May 7							
May 14							

Weekly Calendar

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
7:00							
8:00							
9:00							
10:00							
11:00							
12:00							
1:00							
2:00							
3:00							
4:00							
5:00							
6:00							
7:00							
8:00							
9:00							
10:00							
11:00							
12:00							

Follow these time management guidelines:

Plan a schedule of balanced activities. College life has many aspects that are very important to success. Some have fixed time requirements and some are flexible. Some of the most common that you must consider are:

Fixed: eating, organization, classes, work, church

Flexible: sleeping, recreation, study, relaxation, socializing

Study at a regular time and in a regular place. Establishing habits of study is extremely important. Knowing what you are going to study and when saves a lot of time in making decisions and retracing your steps to get necessary materials, etc.. Avoid generalizations in your schedule such as “study”. Commit yourself more definitely to “study history” or “study chemistry” at certain regular hours.

Study as soon after lecture class as possible. One hour spent soon after class will do as much as several hours a few days later. Review lecture notes while they are still fresh in your mind. Start assignments while your memory of the assignment is still accurate.

Use odd hours during the day for studying. Scattered 1-2 hour free periods between classes are easily wasted. Planning and establishing habits of using them for studying for the class just finished will result in free time for recreation at other times in the week.

Limit your blocks of study time to no more than 2 hours on any one course at a time.

After 1 1/2 to 2 hours of study you begin to tire rapidly and your ability to concentrate decreases rapidly. Taking a break and then studying another course will provide the change necessary to keep up your efficiency.

Provide for spaced review. That is, a regular weekly period when you will review the work in each of your courses and be sure you are up to date. This review should be cumulative, covering briefly all the work done thus far in the semester.

List according to priorities. By putting first things first, you are sure to get the most important things done on time.

Eat well-balanced meals and get regular exercise. Take time for good meals and exercise. Healthy eating and exercise can dramatically improve your concentration, mood, and increase your energy level.

Double your time estimates. Most people tend to underestimate how much time a particular activity / assignment will take. A good rule of thumb is to estimate how much time you realistically think something will take and then double it. More often than not, this doubled estimate is accurate.



Creating a daily to-do list

A lot of students use a to-do list to organize their work. Many of these lists, however, do not increase productivity or decrease procrastination. There are three very important things that separate effective to-do lists from ineffective ones: making a new list every day, prioritizing the items on the list, and breaking items down into small pieces.

1. On the next page, write down everything you would like to accomplish tomorrow. This includes class readings, work on papers or problem sets, chores, errands, phone-calls, exercising, etc...
2. Now look at each item and, **if it feels too big to start, try to break it down into smaller pieces**. For example, don't write down "study for exam" or "write research paper." These items are huge and require many hours to complete – and we often put them off because we don't know where to start. Instead, break the studying down into "review chapters 2-5," "review chapters 6-10," "do six practice problems," etc... and the research paper into "spend 1 hour collecting articles at the library," "write an outline," "write introduction," etc... These items are much smaller, easier to start, and more likely to get done.
3. Next, **prioritize** this list by placing one of the following letters next to each item:
 - A** - Highest priority. Getting these items done tomorrow is very important.
 - B** - Medium priority. You would really like to finish / accomplish these things, but they can wait if you run out of time.
 - C** – Lowest priority. Getting these items done tomorrow is not very important.
4. Now think about when you will have blocks of time to devote to each of these items, making sure you take care of the 'A' items first and the 'C' items last.
Do this exercise daily: it is an effective way of managing your time.

To-do list for tomorrow

[illegible]



Student Workbook Pack

Research Methods for Master's Students

School of Computing

CN.002 Release 3.2c December 2006 ©

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1. WORKBOOK 1. MASTER'S PROGRAMME OUTLINE

The Master's programme has two units of study: Research Methods and Project and the online programme notes together with this workbook pack cover all the information you need to complete it.

1.1 University Expectation

The University expects that when students submit work it is the very best they can do. In practice this will mean several things and all of them will be examined when work is assessed.

English – written English must be of a Master's standard and that means an IELTS score of at least 6.6 (or equivalent) is needed. If submitted written work is judged to be below this standard, students will NOT be allowed to progress to the project stage no matter what their actual language certification states.

Structure – work must be well structured and coherent. In practice students will most often work with a pre-defined set of headings and they must be used explicitly without deviation in their implied content.

Preparation – good work can only be produced if there has been adequate preparation. This will mean a thorough study of any and all references and exercises. Study does not mean a quick read through the notes or academic arrogance which says "I don't need it" or "I know all this stuff". This preparation also means working through the topic idea itself so that one becomes expert in a particular field.

Instructions and Guidance – all the work you submit will have to meet various standards in terms of layout and format and students are expected to following such guidance diligently.

Using other people work – all work submitted must be the student's own but within that work they may refer to the work of others but all material used must have proper attribution. Thus, if another author's work is copied, paraphrased or summarised it must be properly cited. Students need to understand that paraphrasing (putting things in your own words) and summarisation will amount to plagiarism if not properly attributed. This is a very serious matter and the rule with regard to copying is very simple. If 6 or more words are copied then the sources must be cited and if 10 or more words are copied without attribution then that is regarded as proof of plagiarism

Student's Own Work – the submitted work must be entirely constructed by the student and to do this it is necessary to weave into ones own ideas and thoughts the work of others. One may use the work of others to lend support to a proposition, or to include a definition or an explanation and so on. In other words it is not so much a question of how much of another person publication one uses but what one does with it in constructing ones own research work. In short scholarship is acknowledging and using the work of others whereas plagiarism is using the work of others and in so doing attempting to fool the reader into thinking it is ones own.

Respect – when writing one is doing it for another person to read and it's therefore a grave sin in those circumstances not to offer the very best one can produce.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying and it is not just common knowledge or obvious. The key task is to formulate ones own ideas, in your own words by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

1.2 Overview of Unit Assessment

The two units: Research Methods and Project are assessed separately and students must in each one gain at least a pass grade in order to qualify for a Master's award. The assessment artefacts are.

Research Methods Unit (15 Credits)

The Research Methods Unit will be taught over approximately 12 weeks and assessment details will be published to you early in the Unit. The assessments are as follows.

Assessment 1a - development of a project specification plus a short literature review

Assessment 2 - a coursework on statistics.

Project Unit (45 Credits)

The Project is an extended research exercise where students will be guided by a personal supervisor. For students who have passed assessment 1a, approved projects will start a few weeks after the end of the Research Methods Unit and last for at least 18 weeks. There is only one assessment as follows:

Assessment 1b – prepare a full research based project document based on the specification developed in assessment 1a. The details of what is required in the Project itself can be found in Workbook 9.

1.3 Research Methods Unit Assessment Overview

This unit of study requires about 150 hours of effort from each student and will cover research principles, research ideas, research techniques as well as statistics. Assessment details and due dates will be made available early in the study period for the Unit in WebCT.

1.3.1 Assessment 1a – Preparation, Literature Review and Project Specification Development

The first unit event will be related to the development of a project specification and is in two stages.

Part 1 – Project Proposal Approval (up to 10 marks) – when the Research Methods unit begins students need to gain approval for a project title/idea. The university will supply a list of ideas or students may bring one of their own as long as the related project outcome has a strategic business IT dimension, it is new work, it involved learning in IT and it is a Master's level activity. In the approval process students have to write a short submission to a set format and send it in a plain email to the Research Methods tutor whose decision is final. This process must be completed by the due date set in the Assessment 1a papers (normally about week 6)

Students are permitted ONE attempt to gain marks in each cohort at this stage and one of three outcomes is possible:

Approved – the submission, whilst not necessarily being perfect, meets all the above project criteria and the outline is judged good enough for the student to begin work on the specification. About two weeks after approval is granted a supervisor will be allocated who may assist you in finalising the project Specification.

Permitted – the submission has a suitable idea but its construction is judged to be of poor quality but the student is given the benefit of the doubt and is expected to make good in the specification. No supervisor will be allocated and final approval will be depended on the quality of the final specification.

Rejected – the work is received after the due date or submission does not meet the criteria for a project in this degree and a new topic must be chosen and a new application made. Most often this is because there is no Strategic Business IT, the project research is regarded as trivial or plagiarism is detected.

Part 2 - Online Self Tests – these will be available at set times for a set duration every week for the first 5 weeks. Typically 1 mark will be awarded for each test in which you score 65% or better. Students should note that missing any test for whatever reason means the recorded score will be set to zero automatically as there is no provision for taking the test at another time or by another method.

Part 3 – Short Literature Review and Specification Approval – based on an approved or permitted project proposal students prepare a short literature review and full project specification which must be posted into a WebCT drop box on or before the assessment due date. The Research Methods tutor will review the work and write a feedback report for each student. The specification and feedback report will then be placed before a University panel who will decide whether it is appropriate for a Master's level project. At the end of the specification approval process one of four outcomes is possible:

Approved – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Approval will not mean that a specification is perfect and it is expected that students will take note of any feedback given by the Research Methods tutor or the allocated supervisor to further refine it.

Approved Conditionally – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report. Conditional Approval means that there are some significant concerns that must be addressed before work begins and students are expected to redraft their specification, based on feedback given by the Research Methods and in discussions with the allocated supervisor.

New Topic – this means that a student specification has been rejected in its entirety and another topic must be chosen and work must begin again by seeking approval for the new topic before writing a new specification for submission in the next available cohort. This action is most often used when the University decides that the work is trivial, or the work has no significant IT content, or the student has submitted a specification without gaining approval for the topic, or plagiarism is identified.

Plagiarism is Identified – no approval is given and the relevant student work is subject to review by a disciplinary panel. Plagiarism is a form of deliberate deception in order to gain advantage and will always be treated with the utmost seriousness and may even result in students being dismissed from the course.

1.3.2 Assessment 2 - Statistics Coursework

This is usually a set of questions and mainly deals with quantitative data. The submission date will be published to you.

1.3.3 Calculation of Research Method Unit Mark

The overall mark for the Research Methods unit will be calculated as a weighted average for assessment 1a and 2 with the actual calculation being $0.7 \times \text{Assessment 1a percentage mark} + 0.3 \times \text{Assessment 2 percentage mark}$ in which a pass is indicated by scoring 40% or more overall.

1.4 Assessment 1b - Master's Project

This unit of study requires about 450 hours of effort, guided by a University appointed supervisor and based on the specification developed earlier in the programme. The actual project document must be supplied in the form shown in section 9 of these notes and is expected to be of about 15,000 words maximum (excluding appendices).

Once allocated a supervisor, students will be asked on what date they wish to submit their project. The only rule regarding project activity is that it must last at least 18 weeks and no more than 2 years but it will be a matter for students to negotiate with their supervisor and the University to agree a submission date. Students are allowed to make small changes to the specification during the project process but they must be approved by the supervisor and must not amount to a change of the topic that was approved.

2. WORKBOOK 2. RESEARCH METHODS CHAT AND STUDY PLANS

This is a general plan for study for this course. Chat sessions are important because they are collective and interactive and typically focus on just one important feature of research and to get the best out of the course students need to prepare properly. That means reading the notes, doing the multi-choice tests that go with each chapter, studying the Workbooks and contributing if you can to the discussion boards.

2.1 Contact Mechanism

Contact with students is through email, discussion boards or chat. Email is very important and you should ensure that you use an Internet based service so that you can get mail almost anywhere. It is good practice to create an email account just for the duration of the course and a common choice is GoogleMail because the storage space is, for all practical purposes, unlimited. If you are not able to create a GoogleMail account let me know and I will send an invitation to you. It is important that only ONE email account is used for communication and that address is made know to the Research Methods tutor as follows.

Whatever, mail system you use it is advisable to set mail forwarding from both your WebCt accounts to your personal one to ensure that you get mail as soon as it available. It is also useful if students have a Skype or IM account as many tutors allow direct access if they are online. Skype is preferred since chat, voice and video are all catered for and during contact one does not get bombarded with advertising. Internet email services vary considerable but my recommendation is that you only use a service that:

- Provides a virtually unlimited storage capacity
- Guaranteed to work from almost any location: hotels, Airport, etc
- Allows you to set a mail forwarding address (most services do not so check this with care)
- Provide quality SPAM filtering, virus checking and is not on the SPEWS blacklist
- Allows POP redirection (so you can use Outlook and send from databases etc)

2.2 List of Workbooks Sections Available

Here is a list of all the workbooks in this pack. Students must read them as the course progresses and tutors will expect a committed familiarity with what they say.

No	Workbook Name	Comments
01	Master's Course Outline	General overview of course and assessment structure
02	Research Methods Chat and Study Plans	Lesson plans for the chat sessions and student study plan
03	Project Specification Notes and Examples	Shows what a submission should look like with some helpful hints
04	Sample Literature Review and comments	Shows what a submission should look like with some helpful hints
05	Literature Reviewing	Guidance on constructing a review
06	Major Project Elements	Notes on writing a clear aim and a set of corresponding objectives
07	Basic Research Methods Checklist	A list of several possible research methods for quick reference
08	Bibliographic Referencing Harvard APA	Notes on how to use and cite source literature
09	Writing Up a Research Project	Sample content outlines on how to write your project document
10	Project Submission Form	A checklist to use before project submission
11	Marking Form Study Format	A copy of the form use to grade your project submission for reference
12	Marking Form Engineering Format	A copy of the form use to grade your project submission for reference
13	Project Mark Reconciliation Form	A copy of the form to reconcile marks when markers cannot agree
14	Supervisor/marker notes and grade criteria	Use by supervisors and markers to assess project work
15	Unit Level Feedback	Form that allows you to give feedback on each unit you study
16	Research Methods Master Notes	Complete course notes as a pdf file (not in this pack)
Table 1. List of Workbooks		

2.3 Complete Study Plan

Students must work in a committed way for the 12 weeks during the Research Methods unit and submit the work required on the set dates – there will be no extensions given other than for sickness or other indisposition (in which case students need to complete an ECF and provide documentary evidence of incapacity). Failure to deliver on time without permission will mean that the student unit result will be recorded as a fail. For the whole course the timings in hours are approximately as follows:

Course Element	Time	Comments
Chat Sessions	25	Including preparation and summarizing the chat log
Regular Visit to Site	25	For email and discussion board
Study Notes/Text Book	35	Including making notes and doing the tests
Preparing Submissions	65	Including reading the relevant workbooks and topic details
Table 2. Overall Research Methods Unit Study Plan		

2.4 Recommended Timings for Completing the Research Methods Work

Please look at the following list of times for preparation and carefully plan a way through this unit using these estimates.

Course Element	Time	Comments
Statistics Questions	20	There will usually be 4 questions for you to work through.
Literature Searching	10	The key to a successful submission of the assessments is that ones mind is fully prepared with all the knowledge needed.
Task Description	5	Here students prepare a project proposal: the research question, the form of answer expected, the Basic Activity for Generating Data, data specification and decision on a research method.
Project Idea Approval	5	The format used for this can be found in the Assessment 1a description
Research Plan	5	Here students prepare a plan for collecting primary data. This is not literature searching, it is new and original research
Short Literature Review and Project Specification	20	A partial short literature review and comment is provided in Workbook 4. The Project Specification format is presented in Workbook 3.
Table 3. Coursework Submission Plan		

2.5 Recommended Five Week Development Plan

In this course students must write a project proposal as soon as possible using the format set out in Assessment 1a. However, the basic project idea must be developed and refined carefully and typically it will be done in the sequence shown in table 4 where items in blue are specific to Engineering and items in red specific to study projects. Typically this refining process start is week 3 of the course

There is NO short cut in this work and the standards are very high. The expectation is that you will read and study the notes, examples and exercises with dedication and care. Failure to study with care is usually obvious in the quality of the work prepared, so work hard and think through carefully all the steps below – there is NO substitute for thinking your own idea through. There are plenty of examples to guide you but these examples are not templates they are there to help you gain understanding and not as some sort of quick fix to the work.

If the University sees in your work that all you have done is copy the example substituting a few words here and there then it is very likely your submission will be rejected. The University is looking for students who are thoughtful and careful in their work and through a process of hard work each student must demonstrate commitment high standards – nothing else is acceptable.

Week	Work Recommended
2	<p>Topic Area Research – this is about thoroughly understanding the topic area in which your problem is set. For example, if one was looking on Inventory Management using IT in a fast moving retail environment. that is where your literature research efforts are to be directed. So one would look at inventory management itself, warehouse based systems, shop shelf systems, POS systems, tracking fast moving but small value items, restocking, forecasting, re-ordering and so on. The idea is that you take time to think of all the aspects of the topic and then you try to become knowledgeable in them. There is no short cut here and the work must be done thoroughly and with commitment.</p>
3	<p>Presenting Problem Definition – every project will be based on a real-world problem of some kind. Student must define the problem as accurately as possible and that will be the theme of this first work element. Notice the intention is to have just ONE problem definition. (See Workbook 6 section 6.2 and 6.5)</p> <p>Target – this is the intention of solving the problem itself – that is what real-world benefits will result. For example, the problem might be about accuracy in inventory records and that would imply that if we can find a suitable project outcome that can be used to alleviate that situation then it will results in the target of for example reduced inventory costs. Problem and target are two side of the same idea. (See Workbook 6 sections 6.3)</p> <p>Research Question – here one tries to encapsulate the problem definition and ones theorising into a concise and lucid question that will form the focus of the research effort. (See Workbook 6 section 6.7 and 6.9).</p> <p>Theorizing based on the problem Theme – here one theorises about possible causes of the problem and corresponding solutions. In the case of inaccurate inventory records we might theorize solutions as being based on: production of a training plan for staff, feasibility report on possible use of technology, development of a sales policy and so on.</p> <p>Project Outcome Form – during theorization choose what might be regarded as a best solution and this becomes the single outcome intended for a project. For example, if we take the problem mentioned above of inaccurate inventory records then a project outcome could be a feasibility report on the use of RFID as this might be seen as a way of solving/partially solving the stated problem. (See Workbook 6 section 6.4 and 6.7)</p>
4	<p>Primary Data Definition Outline – the primary data definition is affected by means of the BAGD and it needs to be focused on the problem definition and the expected form of answer. (See Workbook 6 section 6.6, 6.8 and 6.9) In Engineering projects the outcome will be an application of some kind and that needs to be described.</p>
5	<p>Aim and Objectives – in the aim and objectives you sharply focus ones project by stating the means whereby one gets the major project outcome by a series of minor ones in order to achieve the project real world target. Of particular significance here is that the distinction between a project outcome and a project target is thoroughly understood. (See Workbook 6 section 6.11)</p>
6	<p>Research Design – this is the core of any project and it is the place where one expects to see serious and consistent thinking about how the presenting problem is to be resolved by collecting and processing primary data in order to generate the expected project outcome that will eventually lead to a real-world benefit called the project target. There are three elements as follows. (See Workbook 3 section 3.2, 3.3, 3.4 and either 3.5.1 or 3.5.2 as appropriate)</p> <p>1. Research Method Selection – this is an overarching framework used to guide and control the research effort. There are many Research Methods and it is necessary by a process of logic based on ones Research Question and it primary data needs to select and justify a suitable method. For Engineering projects the research method is focused on collecting application requirements. (See workbook 7)</p> <p>2. Design of Primary Data Collection Plan – based on the Basic Activity for Generating Data which focuses on the core data needed and then that basic activity surrounded by a process that allow reliable collection of the primary data. (See Workbook 3 section 3.5.2). For Engineering projects the plan is based on the outline application proposal which focuses on the core requirements and outlines a process or processes that allow reliable collection of the requirements. (See Workbook 3 section 3.5.1)</p> <p>3. Design Primary Data Processing Plan – with a collection of primary data in some suitable form one can apply some processing to it in order to arrive at the expected project outcome. Typically this might be statistics if the data is quantitative, various forms of text analysis or diagramming if it is qualitative. (See Workbook 3 section 3.5.1 or 3.5.2)</p> <p>For example, if one conducted a survey on the effects of SPAM on personal productivity then this might have been done with a questionnaire with say 20 questions. Now processing each question and drawing charts and graphs is NOT the same as explaining the effects of SPAM on productivity – to do that one must consider the whole survey where each question would be a dimension of the problem space. It follows that typically one pre-processes the data collection in some way and later using the results of that pre-processing we further process the data to get the intended outcome</p>
Table 4. Specification Elements Work Plan	

2.6 Critical Reflection

Students must expect to go back and forth over their work because as knowledge and understanding grows one will inevitably see that some of one's earlier work was incorrect or not as clear as it could be or maybe it can be improved in some way. This revision strategy is very important as a common fault with research work is that it often lacks consistency because there was no serious reflection on earlier work.

2.7 Chat Session Profiles

The following is a simple guide as to what students will be covering in the online chat sessions. These sessions are extremely important as they are usually interactive and are based on using examples. The research Methods Unit will involve a chat session roughly once every week – half these sessions will be based around the notion of research methods and half based on statistical processes.

2.7.1 Chat Session 1 – Setting up a Project?

This chat session will be a discussion of what is meant by research. The chat will focus on the idea of a presenting problem, target and outcome as the basic project building blocks. From this the chat will move to discuss a framework to surround a research project and a look at some of the core techniques that must be mastered. To prepare for this chat read Workbook 1 and 2 and Workbook 6 section 6.2 to 6.6.

2.7.2 Chat Session 2 – Refining a project Idea?

This chat will take the form of a discussion on how a project idea is explored and focused and a full example will be used followed by an open discussion and questions from students.

To prepare for this chat, students should be familiar with the title approval format shown in Assessment 1a and the specification examples and notes shown in Workbook 3 sections 3.5.1 and 3.5.2. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea. Of particular concern in this chat is the notion of presenting problem Workbook 6 section 6.2 and form of answer (project outcome) in Workbook 6 section 6.3 and 6.7, Basic Activity for Generating Data Workbook 6 sections 6.8 and 6.9. Students must work hard on these three ideas if they are to form an acceptable project specification.

2.7.3 Chat Session 3 – Research Method and Research Designs

In this session a research design will be developed based on a personally developed problem definition, research question, form of answer and Basic Activity for Generating Data. To prepare for this chat students should be familiar with the title approval format shown in assessment 1a and have studied the specification examples shown in Workbook 3 sections 3.5.1 and 3.5.2 as well as the associated notes in section 3.1. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea.

2.7.4 Chat Session 4 – Literature Reviewing and Working in a Scholarly Manner

In this session some examples of student work and how they write down their ideas will be examined based on scholarly principles. This will be followed by looking at a process that applies equally to what one writes and what one reads. The remainder of the chat will examine several excerpts from student work that exhibit common faults. To prepare for this chat read workbook 8 on citation styles and bibliography, chapter 4 of the notes and Workbook 5 and it might be useful to read through the sample short Literature Review in Workbook 4. In addition, it will be useful if one look at one's own way of using primary source materials and find some examples that are good and bad.

2.7.5 Chat Session 5 – Aim and Objectives

This chat will focus on how to write an aim and a set of objectives based around a problem definition and a Research Question. To prepare for this session read Workbook 6 sections 6.11 and Workbook 9 section 9.6.3 but also consider one's own project idea and what might be suitable in that case.

2.7.6 Chat Session 6 - Open

This chat will look back over the course and typically review faults that arose out of the assessment of the project specification. This will be supplemented by a discussion as to how various project elements: title, research question and Basic Activity for Generating Data, aim (not aims) and objectives are constructed but focused on the basic Activity for Generating Data.

2.7.7 Extra Chats - Open

Normally, each week there will be an open chat on Sunday at 1400-1500 where students may bring their questions, comments, concerns or grumbles. These are useful sessions but only when students come prepared with items that they need to discuss. These are not teaching sessions so the tutor will have nothing to say unless students come prepared with questions and are willing to participate.

3. WORKBOOK 3. PROJECT SPECIFICATION NOTES AND EXAMPLE

This section contains some guidance notes and sample completed project specifications - please consider them carefully. Do NOT copy them blindly – they are just for guidance and students must write their own in a way that matches what they want to do. The aim of the specification is to state a project plan as clearly as possible so one needs to be concise and precise.

3.1 Project Styles

In projects two styles are commonly found. There are some restrictions on these two forms depending on what programme you are on but the Tutor will advise on that issue. Briefly the two styles are as follows:

Engineering – here you design and build a software application, create a system design etc.

Study – here you design a research program to collect primary data in an attempt to find an answer to an interesting question. For example, one might investigate whether cascading styles sheets lead to simpler accessibility or you might evaluate the role of email management in business success.

3.2 Specification and Design

The following notes and samples for project specifications may help you prepare your own. However, it is important to think of it as being primarily a design for your project. The specification is essentially in three parts although it is not presented in exactly this sequence:

Preparation – this is not explicit in the specification but implies that you have thoroughly reviewed the literature at least to the depth of feeling confident that you know enough about the project topic to define and gather data. Implicitly, the University will look at your use of the literature and reference list to assesses how prepared you are for this work at this level and on this topic.

Background – this is about you setting the scene and defining a problem and then focusing on that problem with a Research Question, aim and a set of objectives.

Research Design – this is the culmination of the specification where you set down your detailed design for defining, collecting and processing primary data to get your stated form of outcome. It is very important to realise that this is a design and without a sound design things are likely to go very wrong.

In summary, one needs to think of the whole processes as starting with a problem definition and ending with a solution (your project outcome) and the element that connects these two things is your research design. It follows that unless you have a good design you will not be able to get from your problem to your outcome and that will mean your project fails.

3.3 Project Specification Headings and Formatting

All the following main headings and subheading must be used and students must not introduce others. As these guidance notes are read it is advisable to also look at the relevant examples in section 3.5 so that one can clearly understand what is being said.

3.3.1 Specification Header

Make sure all your details are entered correctly otherwise work may be misfiled or rejected because we cannot ascertain whose work it is.

3.3.2 Project Title Construction

Project titles must make clear sense in English and not be overlong. See Workbook 6 section 6.13.

3.3.3 Specification Intention

This element is to be a simple statement regarding whether there is an actual real world client for the outcome of this project or if it has some other purpose.

3.3.4 Project Task Description

The main function of this section is to explain what is going to be done using the suggested headings below and as shown in the sample. The headings are intended to be precise and if students ignore or change them or use them for any other purpose the work will be rejected. The actual selection of headings will depend on the type of project: Study or Engineering.

Engineering Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct an Engineering project task description and must expect to go over them many times before a concise and useful description is formulated. For Engineering projects please note that a functional description means that one says what the application will do for the users and not how it might be built or what architecture is involved.

Situation Overview – express here a concise and high level description of the existing or proposed application area.

Presenting Problem Definition – a concise definition of some real world problem related to data processing of some kind. This is an important step since unless one can clearly see what the problem is then any solution suggested may be deficient in some way. In most cases the problem definition in engineering projects is related to elements such as data availability, searching, access speed, storage, processing, accuracy, sharing, reporting, entry, updating, deletion, control, security, volumes, segregation, consistency, worker efficiency, process systematization, communication and so on. For the purposes of writing a specification the expectation is that students will focus their problem definition on one major aspect of the application scenario. See Workbook 6 section 6.2 and 6.6.

Real-World Target – a summary of the real world effects that are expected if this problem can be solved or partly solved.

Application Proposal – expressed as a concise description of the main system functionalities. When describing the main functionalities it should be done at a high level and it is recommended that they are all coherent and there should be no more than 10.

Ethical Overview – express here a concise review of any ethical impacts of gathering the primary data, processing it or system usage.

System Architecture – a concise description of the major or main architectural elements of the proposed application

Strategic Value – expressed as a concise argument that the application is able to deliver to the stated problem definition.

Study Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct a study project task description and must expect to go over them many times before a concise and useful description is formulated.

Project Topic Area Overview – a concise description of the topic area aspect being covered.

Situation Overview – a concise, high level description of the context in which the research is set.

Presenting Problem Definition – expressed as a concise statement of the single underlying problem leading to this study. This is an important step since unless one can clearly see and define what the problem is then any solution suggested may be deficient in some way. Study projects look at an aspect of strategic business IT and that might cover technology effectiveness, IT investment, user acceptability, development or improvement plans, feasibility studies, legacy systems and so on. See Workbook 6 section 6.2 and 6.6.

Real-World Target – what desirable real-world benefit is likely if the stated problem can be resolved or partially resolved. (See Workbook 6 section 6.3)

Research Question – expressed as a concise question that captures the problem definition and the real-world target. See Workbook 6 section 6.7 and 6.9.

Personal Theory – expressed as a concise and focused rationale regarding what an answer might be to the Research Question. See Workbook 6 section 6.5.

Intended Project Outcome – write a concise statement that expresses the expected major project outcome as it arises out of the stated problem definition and your personal theory and would be an answer to the Research Question. See Workbook 6 section 6.4, 6.7.4 and 6.9.

Strategic IT Value – here it is necessary to discuss ones intended project outcome and show that it is or leads to a Strategic Business IT impact that could eventually resolve the stated problem definition and hence generate a Strategic Business IT value. See example in Workbook 4.

Ethical Overview – a concise review of any ethical impacts of gathering the primary data, processing it, presentation or usage of results in the form stated

3.3.5 Overall Project Aim

This is a vital point in the specification because in a very concise manner a researcher brings together in one aim: the main project **activity** to get a stated project **outcome** as well as telling us what **data** is the focus of the activity and finally what the purpose or **target** for the project outcome is in relation to real-world problem resolution. It is essential that you fully understand these four elements as described in Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3.

3.3.6 Set of Project Objectives

To meet an overall aim it is necessary to achieve a number of milestones indicated by a set of objectives generating minor outcomes. Objectives can be hard to write and it is expected that there would be between 3 and 6 of them. See Workbook 6 section 6.11 and 6.10.2, Workbook 9 section 9.6.3.

3.3.7 Research Design

The Research Design is about the core elements that generates primary data and processes it into the form of answer expected (your project outcome). The Research Design is divided into two phases.

Design for Collecting Primary Data – a process or processes used to define and create a primary data collection. It has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the actual data and present that data.

Design for Processing Primary Data – a process or processes used to manipulate the collection of primary data to get the form of answer expected.

A useful analogy for a Research Design is that it is like deciding that you want a sponge cake and then working with a shopping list (a list of primary data that you want) to collect a bag of ingredients (collection of the listed primary data). Once we have our ingredients (primary data) we use a recipe to prepare and mix them (pre-processing the primary data) ready for the final processing step to bake the cake (like generating your form of answer). To reverse the analogy, if you were going to make a cake you would not walk into a shop and just pick up a random set of ingredients and then mix them all together into some muddle, bake it and expect a cake to emerge - no one but an idiot would do that would they?

The suggested headings to use are as follows and you are recommended to use them carefully in a step by step manner to construct a research design. You must expect to go over them many times before a concise and useful design is formulated. In the examples I have added the step numbers for clarity but you do not have to do that in your own work as long as all the elements are present.

Engineering Projects Research Design Format

Research Design Phase 1 – Requirements Collection Process

This phase is concerned with a process that generates a reliable collection of primary data which in an engineering project will be a set of requirements. See Workbook 7 section 7.10.

Define – here one bases the definition of requirements on the outline proposal document.

Location – state where or from whom the requirements can be found.

Collection Protocols – here it is necessary to select appropriate collection protocols such as: interview, observation, records searching and so on needed to collect the requirements under the standard four headings: Functional, Non-Functional/Performance, Technical and Usability. See Workbook 6 section 6.6.1.

Requirements Presentation – the requirements data once collected will typically be presented as interview transcripts, notes and copies of documents and lodged in the project document appendix as a kind of requirements catalogue.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulate it to get a design for the application. This is in two sections.

Overview – show how the various requirements are expressed in a design.

Specific – in any design there will be aspects that have no obvious means of expression and such aspects are typically written as a list.

Study Projects Research Design Format

Research Method – make a selection and write concise rationale for its use. See Workbook 7.

Research Design Phase 1 – Primary Data Collection process

This phase is only concerned with generating a reliable collection of primary data and is based on the Basic Activity for Generating Data but to be it has to be surrounded by a complete process.

Basic Activity for Generating Data – a concise description of the activity that forms the core of the primary data collection process. See Workbook 6 section 6.8 and 6.9

Primary Data – outline primary data items to be collected. See Workbook 6 section 6.6.

Location – a concise description of where the primary data may be found. In practice it may come from almost anywhere including extraction from existing secondary sources.

Collection Protocol – a concise description of the actual collection procedure which may be based on one or more of the following: interviews, questionnaires, observation, roles playing, document analysis and so on. See Workbook 6 section 6.6.1

Primary Data Presentation – expressed as a concise description of the way in which the primary data will be presented.

Research Design Phase 2 – Processing and Presentation

This phase is only concerned with a processing the collection of primary data in order to get the expected project outcome.

Design of Pre-Processing for Primary Data Collection – concise description of the processes applied to the raw primary data collection to generate a refined collection of primary data structured in a fashion that makes it suitable for generating the intended project outcome. (Workbook 6 section 6.6.3) (Please note that this step will not always be needed)

Design for Primary Data Presentation – presentation of data collection generated from the pre-process step - if that step is not needed just a presentation of the primary data.

Design for Generating the Intended project outcome – here the primary data collection (pre-processed if necessary) is used in some algorithmic or heuristic fashion to generate the intended project outcome.

3.3.8 Logistics and Tools

In this section the practicalities in terms of tools and time need to be considered. It is only necessary here to state things that are specific to this project, so it is not required to say things like: the library, Word, Excel, paper, pen, SPSS and so on as these are common and almost always available everywhere.

3.3.9 Outline Content List for your Project

This should be detailed enough to ensure that there is a clear idea of the final structure of the project document. Please be careful with the essential elements as indicated on the marking forms since if they are omitted a significant number of marks may be lost in the final project. See Workbook 9 table 6 and section 9.3.5 where typical chapter and section headings can be found. Workbook 11 or 12 (marking forms) need to be consulted so that no essential elements are omitted

3.3.10 References

This section is used to assess how well a student has prepared for the project activity. The University will want to see that the reading is current, comprehensive and focused on the topic area. It is expected that work in the specification will be supported from the literature particularly in the outline description and research method sections. Unless the literature is seen to be used in the various sections of a project specification it may not be approved although it is not expected that one cites from every book in a reference list. See Workbook 5 and Workbook 8 and make sure citations are in the Harvard APA style.

3.3.11 Project Plan

The plan must be developed by looking at ones contents list and considering what activities are necessary to generate the various project objects. Aim for around 12 to 20 activities lasting at least 18 weeks with any suitable start date. A project activity is something that is significant and requires planning and monitoring. So for example:

Prepare Metric Program – this is clearly a significant activity that has to be planned and monitored and so properly part of the plan

Select an Organization – this is an activity and might be important but it is doubtful if there really is a significant process involved here that has to be planned and monitored.

Outline Implementation Plan – this is not an activity so should not be in the plan.

The University will examine each plan and will want to see that it is focused on the project – the implication here is that it should be possible to see that a given plan supports a particular project idea not juts a copy of one of the samples or is so generic it might apply to any project.

3.4 Testing Your Research Design

A design must amount to a logical plan that takes a problem definition to a description to the expected outcome that will resolve the stated problem. The following are a useful check that a plan is sound.

Practicality – consider whether one has the resources to be able to carryout a plan. This is a very serious step and must not be taken lightly. It is all very well to have an elaborate plan on paper and to think because it all sounds logical that it can actually be done. In many cases a crucial test of practicality is to be sure that one can get the data from the locations specified.

Credibility – here one is expected to be honest and decide whether the plan will result in useful data and outcome. It is unfortunately true that many research projects end up being trivial because of poor identification of data and more importantly the choice of appropriate collection protocols. It is also worth considering the data processing functions as they must also be credible.

Confirmability – this test is about what would happened if the same research was done a second time with the same data – would the researcher end up with the same answer. To put it another way, is the processing method too dependant on an individual and that dependence may lead to bias.

Trustworthiness – here we are concerned that the conduct at all stages is such that one could have confidence that the results are genuine and not manufactured.

3.5 Example Specifications

Here are some sample specifications, they are complete except for the contents list and project plans but they are not meant to be copied without any conscious thought and any obvious attempt to do so will result in specification rejection.

3.5.1 Example Complete Engineering Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – the customer is SIS and the application is expected to go live by June 12, 2006.

Project Title - An Assessment Marks Processing Application. (See Workbook 6 section 6.13).

Situation Overview

Currently, the core processing is done by staff members dealing with their own assessment marks, typically using Excel. The staff member then forwards his marks sheets, usually in paper form, to the administration office where the marks are collated using Excel to give an overall score for each student. These two marks sheets: individual unit marks and overall student marks are then presented to the Board of Examiners for scrutiny and acceptance. The process ends when a transcript is sent to each student detailing their results for that semester.

Presenting Problem Definition

The actors feel that the root problem is about consistency and accuracy given the sensitivity of the data but coupled with difficulties with storage, retrieval and reporting. (See Workbook 6 section 6.2 and 6.5)

Real-World Target – the desired effects here are that consistency and accuracy are both improved but at a reduced workload. (See Workbook 6 section 6.3)

Application Proposal

Based on the presenting problem there an application is needed that can offer us consistency and accuracy in the processing of assessment marks, both by unit and by overall student performance. The system to be called a mark processing system and it will have the following main functionalities.

Functional Requirements

1. Store name, address, year of study, name of course and unit details of all registered students.
2. Store the assessment patterns for each unit including weights and pass mark.
3. Allow for the entry, updating and deletion of any or all records.
4. Allow for the entry of assessment marks for individual entry or by batch updating via CSV
5. Report on marks for each unit including basic statistics.
6. Report of overall student performance, including basic statistics.
7. Produce student transcripts.
8. Provision for other ad hoc reports at a later date.
9. Secure access to individual results to be available to students through a portal.

Non-Functional and Performance Requirements

1. Store records for at least 6 years.
2. Allow for at least 6 simultaneous users
3. System must be capable of processing all the data and providing the reports within 10 working days. The estimated current volume is 145,000 data entries and 139 reports but this is expected to grow by about 7% per academic session.

Technical Requirements

1. Be developed in MS Access 2003.
2. For use under Windows XP.
3. All processing activities, including reporting, to be carried out using native Access facilities.
4. All processing is to be done using Access VB and no macros are to be used.

Usability

1. Be developed using normal windows formats and standard colours.
2. Fonts use in screen to be no smaller than 9 point and standardised at Ariel Narrow.
3. Assumed screen size to be 19".
4. Report to be printed as appropriate but with fonts never less than 10 point.
5. Data entry load per screen to be as recommended in DEF 981.90.
6. There should be some consideration of access via the portal for the visually impaired.

Ethical Overview

The collection of requirement here does not present any ethical problems. However, when in use the system contains personal and sensitive data and this aspect must be considered in the design

System Architecture

The intended application is essentially a database system with a web link. It will therefore have two interfaces: one a direct link to the database through the Access application and the other through a secure web interface routed through a portal but with only read access.

Strategic IT Value

The proposed application and its functionalities should address the presenting problem very well. In particular controlled data entry, data storage and reporting. This should reduce administration overheads and costs in a cost-effective manner.

Aim

To build an assessment marks processing system using standard MS products in order to ensure consistency and accuracy in the processing of student results. (See Workbook 6 section 6.11 and 6.11.1, Workbook 9 section 9.6.3)

Objectives (See Workbook 6 section 6.10 and 6.10.2 and Workbook 9 section 9.6.3)

1. To produce a detailed, departmentally based, marks processing requirements document.
2. To produce a detailed marks database design using standard documentation protocols.
3. To produce a detailed assessment functional design to include data entry, updating, deletion for marks processing and reporting.
4. To design the secure portal for student use.
5. To produce and evaluation report of the marks application.

Research Design Phase 1 – Requirements Collection Process

This part of the research design is concerned with constructing a reliable primary data collection for later processing into the form of answer expected. In this case the primary data collection is a set of detailed requirements for the marks processing application. The primary data that we need is related to the proposed major functionalities stated earlier and given to us in the form of a proposal. For each of the functionalities it is now necessary to decide. (See Workbook 7 section 7.10)

Location – The requirements can be found at various locations in Portsmouth. In particular

Detailed Functional Requirements: the appropriate targets for this exercise are: SIS office administrators, departmental course leaders, individual academic staff, Heads of Department and the University registry (for regulatory aspects). It may also be useful to make contact with a number of external examiners to ensure that the reporting arrangements are acceptable. In addition there will be various documents such as regulations and marks sheets

Non-Functional and Performance Requirements: the appropriate targets here are the Registry since they set examination and graduation dates as well as define the necessary reports. The office senior administrator also needs to be consulted for staffing and usage issue. During this process there must be detailed discussion with the department and the Registry over security issues as this is a major ethical issue. In addition there will be various documents such as regulations, external examiner reports.

Technical Requirements: the appropriate target here is the departmental technical to establish hardware and software profiles. It may also be necessary to discuss network and security issues with the University central computing department. It may be necessary to see network and PC specifications and various security profiles.

Usability Requirements: the basic design is based in Windows protocols so there are no particular requirements to be gathered. However, because it is possible to implement interfaces in a few ways particular usability requirements will be ascertained by use of a mock-up used with the administration staff. With regard to the Portal there will need to be discussion with the University webmaster over formats and protocols to be used. In addition there will be various documents defining standards and formats.

Collection Protocols – The collection is essential a survey format where each requirement aspect will be discovered by just three formats: (See Workbook 6 section 6.6.1)

Detailed Functional Requirements: expressed as interviews, document analysis (marks sheets and regulations) and some observations. It may also be necessary to use observation to examine any existing Portals.

Non-Functional and Performance Requirements: interviews, document analysis (marks sheets and regulations) and observations.

Technical Requirements: interviews and document analysis (system specifications and profiles)

Usability Requirements: interviews and document analysis (system specifications and profiles). In addition it will be necessary to run some focus groups to look at various interface design option by means of mock-ups.

Requirements Presentation – the requirements data once collected will be presented as interview transcripts, notes and copies of documents. These artefacts will be reviewed and a tabular format used to present the requirements and lodged in the project document appendix.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulates it to get a design for the application. This is in two sections.

Overview – here the vehicle used to present the various requirements in a design format will be UML. The mechanism will be to take the written requirements documents and map them to a suitable diagrams in the form of use cases, class diagrams and where appropriate collaboration or sequence diagrams.

Specific - where necessary a written list will be provided. These will mainly be used to state unambiguously the various non function, technical and usability details.

Logistics and Tools – Required Resources

All the hardware and software are available at the Client's premises and all work including requirement gathering will take place there. The major products needed are: Dream weaver and MS Access and scripting will be done using ASP.

Outline Content List for your Project

See project guidance notes for samples and they can be found in Workbook 9 section 9.3.5 and table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See Workbook 8)

Walker (2001), IT Problem Management, Prentice Hall, 0-13-030770-5

Bruton (1997), How To Manage The IT Helpdesk, Butterworth Heinemann, 0-7506-3811-7

etc

Project Plan

Any clear format may be use but a typical format (but not events) can be found at the end of the Study Project sample specification.

3.5.2 Example Complete Study Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Study) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2653)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – no customer involved and project results will be used to produce a research paper.

Project Title - Quality Control in Program Development - A Possible Strategy (Workbook 6 section 6.13).

Project Topic Area Overview

There is much interest in Software Quality assurance at present and this is for obvious reasons. Software applications are unlike normal products which wear out and can be tested over time to see where most wear takes place and hence calculate a mean time between failures. By this means failure can be effectively prevented by maintenance. However, in software such wear does not occur although an analogue of this is when other hardware and software components around the software, or the application itself changes and hence problems arise. Typically, we test program code and the more we test the code the more certain we become that it is robust.

Situation Overview

The research is set in The University of Portsmouth with the School of Information Systems. In that context it will focus on the programs produced by first year computing undergraduate students.

Presenting Problem Definition

The problem for developers is focused on knowing when code is robust and ready for release. (See Workbook 6 section 6.2 and 6.5).

Real-World Target

The benefit that would accrue in the real-world if this problem can be resolved or partially resolved is that developers can feel more confident about their product and therefore not risk costly development overruns and compensation claims from clients. (See Workbook 6 section 6.3)

Research Question

How can developers feel sure that software applications are ready for release in order to prevent costly overruns and client disappointment? (See Workbook 6 section 6.7 and 6.9)

Personal Theory

The topic is fraught with difficulty because there is no accepted way to measure program code to see how good it is or even to see if it is correct. Blithe (2002) explains that it is well understood that it is not normally possible to measure, using an interval and ratio scale, in any meaningful way the quality of program code. However, it might be possible to find some means of 'indicating' the quality of the code in the sense that one might be able to pick outliers by taking certain kinds of measurement. It is therefore suggested, that simple measurements of various code properties might be used to pinpoint outliers and hence shorten the testing cycle by transforming the measurement statistically into a pseudo Interval and Ratio scale form which is called Planar Similarity. (See Workbook 6 section 6.5).

Intended Project Outcome

It is expected that the form of the answer arising out of this theory will be a demonstration in the form of a report with graphical evidence that endorses the proposition that Planar Similarity is an appropriate software quality indicator in that outliers can be detected hence assuring the measurement process. (See Workbook 6 section 6.4 and 6.9)

Strategic IT Value

If Planar Similarity is indeed a useful measure of software quality it can be used routinely to examine software in production and give an early indication of quality and that will lead to shorter test cycles and hopefully more reliable software installations and a consequent reduction in cost. In fact Clitheroe (2003,p6) has suggested that detecting all code faults at the initial coding stage might save as much as 23% of development costs. (See example in Workbook 4)

Ethical Overview

There are no current users of the process being developed there would not seem to be any ethical consideration of importance. However, it is necessary to explain to the students supplying the sample programs the purpose of this study and assure them that none of this information will be used for assessment and allow them access to the results if they so wish.

Aim

To report on the efficacy of the Planar Similarity measure using simple metrics as a means of finding outliers in program code and hence reduce coding errors leading to development cost reduction and client approval. (See Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3)

Objectives (see Workbook 6 section 6.11 and 6.11.2)

1. To model the software construction process.
2. To report on appropriate simple and synthetic metrics that might be used as indicators of quality in application programming code.
3. To define a process that will extract the defined metrics for any piece of code.
4. To document a suitable statistical process for reducing the metric value set to just two dimensions.
5. To analyse and report on the data, including outliers, and hence derive some general conclusions regarding the utility of the Planar Similarity metric.

Research Design - Research Method

The chosen method will be case studies since I want to see the impact of the measurement process within a defined context and of particular interest in that context is student programmers with differing abilities in writing business application style programs. The case criteria are simple and amount to selecting a sample of students at a set point in their first year of study and a set of matched programming tasks. (See Workbook 7)

Research Design - Phase 1: Primary Data Collection Process

This part of the research design is solely concerned with constructing a reliable primary data collection for later processing into the form of answer expected.

Basic Activity for Generating Data

The basic idea is to compare a new piece of code with an existing piece that is known to be sound and take a series of measurement on each one that might highlight any differences and so indicate an outlier. The idea has some support based on early studies carried out by Sheene (1999) who noted that a reasonable means of indicating quality in program code is to compare similar pieces of code by calculating several metrics for each piece although he did not define how this might be done practically. (See Workbook 6 section 6.8, and 6.9)

Primary Data

This study will define 20 software metrics which will be calculated automatically and for each sample programme. The metrics that form the primary data collection for this research will be such things as: function density, function count, cyclomatic complexity, data associations, decision count, decision density, number of variables, number of function calls, etc. (see Workbook 6 section 6.6)

To set up the case studies three computer program specifications will be drafted with the students working in 'C++'. The specifications will be written so that the defined software application is, in each case, of a different style and progressively more difficult. An expert in 'C++' will produce a set of generics to match the requested programmes – it should be noted that a generic is an outline or skeleton of certain kinds or classes of program.

Location – The sample frame is all first year students on computing courses at Portsmouth University. This is around 350 students and my calculated sample size is 200 students, however, since the data collection process is automatic all 350 students will be used in this study.

Collection Protocols – The collection is essential a survey format where the students will be given the relevant generics and the specifications and asked to write three computer programs of increasing complexity, one in each of three semesters. In this case there is a large data set to be collected and it is not practical to do the collection by hand. In view of this an application will be written that will process each student program so that metrics may be calculated automatically and stored in a suitable electronic file. Students will be requested to deposit their programs on set dates into an online drop box for both marking (not part of this study) and metric calculation. (See Workbook 6 section 6.6.1)

Primary Data Collection Presentation

The sets of primary data will be available in the project document appendix and will be presented in tables where the rows represent the sample programs (one row for each sample) and the 20 columns the metric values.

Research Design - Phase 2: Processing and Presentation

This part of the research plan will take the whole collection of primary data and manipulates it to get the expected outcome form, which was a demonstration that outliers can be detected hence assuring the measurement process. The processing is in three steps: manipulate the raw primary data, presented the processed data in graphical form and extract from the graphs features by manual inspection.

Design of Pre-Processing for Primary Data Collection (Workbook 6 section 6.6.3)

The metric data sets will be read directly from the files produced in phase 1 and then statistically processed to define a similarity measure for each program using principal component analysis and multidimensional scaling. The outcome of this processing will be pairs of values, one pair for each sample program, suitable for plotting in two dimensions.

Design for Results Presentation

The pair of values from the first processing round will be plotted in two dimensions, together with the results for the generics producing three graphs one for each program specification.

Design for Generating the Intended Project Outcome

Once the graphs are available it is then a simple matter to look for outliers in particular and attempt to explain their distance and orientation from the generic and other programs in the class. The contention is that similar programs will cluster together and ones that are different (even though the specification was the same) will show up as outliers and can be identified and examined to see why that difference occurred. It is hoped that the results will be similar for all three program in that data set and hence demonstrate that complexity is independent from planar similarity.

The final step is to use the identified outliers to go back to the actual program code to explain why the code produced the outlier. In this way it will be possible to get an indication of why a given program is deficient. This final processing step allows me to generate my report on Planar Similarity that contains my overall findings and evidence on its utility.

Logistics and Tools – Resources Required

All the hardware and software are available at the University. Since the data collection process is automatic the use of staff resources is minimal.

Outline Content List for your Project

See project guidance notes in Workbook 9 section 9.3.5 table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See workbook 8)

JKM Quality Assurance Handbook (Company Confidential)

Garlick, F. J., (1993), Planar Similarity - A New Synthetic Metric, SQM, Elsevier, 1-85312-225-4

etc

Project Plan - Master Schedule expressed in weeks (You may assume that a project take about 18 weeks to complete)														
Dates are Mondays	March				April				May				etc	
Event	6	13	20	27	3	10	17	24	1	8	15	22	29	etc
Literature Search														
Identify metrics														
Write Metric program														
Etc.														

4. WORKBOOK 4 – LITERATURE REVIEW & STRATEGIC IT VALUE NOTES/EXAMPLES

This is a sample of what is expected in assessment 1a, however, it only shows two elements: the strategic business IT statement and the short Literature Review. Try to keep in mind that this is just ONE example and do not try to copy it blindly or try to fit it into what you want to do.

Strategic IT Value

This work was based on trying to resolve or partly resolve the problem of low quality code leading to the need for costly re-work at later stages in the development cycle. The importance strategically of this work is that the outcome: a definition of new software metric will imply that it is possible to identify poor application code and this can be done at an early stage in the software development life cycle. The importance of this is that corrective action can be taken early in the development cycle and as a consequence costly re-work late in the cycle can be avoided or reduced. A secondary or added value element is that the results will allow the identification of good programming standards and this in itself will also lead to improvement and strategic advantage on all products delivered.

Tutor Comment

The key element here is that one relates the expected outcome or form of answer to its use in resolving the problem theme that was the basis of the project, and hence demonstrate a strategic business IT value. Failure to create a clear argument based on the problem theme and outcome leading to a strategic business IT value will mean loss of marks.

Literature Review (See Workbook 5 but note section 5.6 in particular)

Hiskett in his 1987 seminal paper on metrics defined several apparently useful metrics, the best known of which are 'program vocabulary' and 'program length' which are essentially metrics that count operators and operands and their usage in a given piece of code. Hiskett's metrics are easy to calculate but he was unable to show any strong correlation between his measures and program quality as defined by experts in the field. Similarly, Rogers and Hamerstein tried to use Hiskett's metrics as predictors of MTBF in accounting software but the results were inconclusive and no link could be found between the metrics and the type of software (functionality), accounting in this case, and the metric used.

Garlick, Sheene and Southwood (1999, p450) attempted a new approach that involved the notion of similarity, which they called planar similarity – that is two programs could be defined as similar because: they are written in the same language or they perform similar functions or they were written to the same standards or they are written to the same specification or they were written by the same team or finally they perform the same function. Their work is aptly summed up in the opening paragraph of their paper:

"The nature of any true measurement is easy repeatability and this implies that the style of measurements form a suitable metric space. This means that we need to define the nature of the similarity before we define a measure. In principle this is simple since it is easy to name the similarities but in practice it has been difficult to articulate a precise definition."

The similarities described above deserve further explanation but here only two of them in combination are used: similar language and similar or same specification. Similar language is easy to understand but at first glance it would seem that if two different programs are written to the same specification they are bound to be the same. However, after a little thought, it is obvious that if two different people write two different programs to the same specification the programs are certain to be different in many respects. It follows that that the basic, though loose, hypothesis is that if planar similarity can detect a similarity (alternatively difference) in these programs - written to the same specification but by different people - it might be possible to use planar similarity to detect differences between two or more programs against any defined mode of similarity. Conversely, if it cannot be shown that a similarity exists between two or more programs written to the same specification then there is no hope whatever of showing any other kind of similarity with this metric.

Two final points need to be considered: what exactly is meant by software quality and why would a similarity measure be a good indicator of quality? To answer the first question we have only to refer to Kitchenham's 1998 paper where she defined five kinds of quality, briefly:

Transcendent View – quality is a kind of innate excellence, something felt rather than seen.

Product Based View - quality is related to the content/attributes of the product.

User View – quality is seen as equivalent to fitness for purpose.

Manufacturing Based View - quality is equated with conformance to specifications.

Value Based View - provide product at an acceptable price and conformance to a specification.

In this study the transcendent view was the one chosen as the basis of the definition of quality. The meaning of this view is defined by experts in the field – that is, can an expert in, say, Java programming make a judgement as to whether a given piece of code is good or bad – well, here it is argued that such an expert can and does such tasks routinely. Curiously there is very little literature on this idea of expert opinion within the software community but Gavin as early as 1978 touched on the subject. However, it is a reasonable conjecture and it will be used in this study – interestingly, if it can be shown that planar similarity can detect similarity (or equivalently differences) then it would also support the conjecture that experts can judge software quality.

Finally, the study will rely on the ability of experts to judge quality in software. This judgement is exemplified in the production of exemplar or generic programs. Garlick (2003, p98) has written extensively on this subject and the work is well known and will not be fully reviewed here. However, it is possible to define classes of program modules - validation, input, calculation, reporting and so on – it follows, that using the idea of similarity it is useful to create a standard or *generic* program or module for each class. Such a program can then act as a base line for all planar distances related to its application class and hence be a measure of similarity (or difference).

Using Garlick's idea we can let experts define our generic and then use that to compare with other programs – if we declare a difference then in simple terms we need to look at that program because it might be of poor quality and conversely if we declare no difference then we can fairly conclude that the program is sound.

Tutor Comment

The literature review is supposed to be a student's own work. As such it is a discourse that outlines the major areas of a topic area but amounts to an essay which is the student's alone. In practice this means that students must read deeply into the subject and then weave what is read into what the student already knows or believes in order to create a useful summary of the topic that will form a strong base for carrying out the actual primary data research - this implies that you 'master' the subject area and become expert in it.

It follows from the above that if all you do is copy or paraphrase from various sources without any significant comment or analysis on your part then it amounts to plagiarism and is worthless.

One final point is that when you write up your review in your final project document you should use various sub-headings and other formatting elements to structure the section to make it readable and meaningful.

5. WORKBOOK 5. LITERATURE REVIEW

The main function of this review is to ensure that one's mind is prepared with all the specific problem area knowledge that it needs to carry out the project and its primary research. In practice this implies the rather difficult task of integrating different ideas, theories and experiences into a thematic, informative, complete and clear discourse on your chosen subject area.

Preparation of the mind is done through adding your critical evaluative comment on what you find in the available literature and such critical reviews are typically hard work and not about downloading a few articles from the internet. The key characteristic of the greatest thinkers in history was absolute and unswerving honesty in all their thinking and that principle has never changed. They used their intellect and reasoning abilities to the full. They were honest no matter what the subject be it religious, political, business or academic. These men would not accept dogma from religion, politics or academic sources without subjecting it to serious critical questioning and of course this often meant great suffering for them.

5.1 Plagiarism

The KEY is honesty – without that your work is worthless – you may be able to fool some people but as Shakespeare said “This above all: to thine own self be true, and it must follow, as the night the day, Thou canst not then be false to any man. So when you plagiarize I may not know, the University may not know but YOU will always know that you obtained something falsely.

Plagiarism means passing off other people's ideas as your own. In academic life, it is one of the worst things that anyone can be accused of, as it is a form of stealing or cheating. It is fully expected that students will carry out research prior to completing a piece of work. This may include the use of books, journal articles, reports, manuals, notes and so on as source material. The material may be public, restricted to a closed set of people or with a security classification), or privately communicated. The principles are the same whether the material is on paper or in an electronic format. When you refer to an idea in a piece of your own work, it falls into one of several categories:

Common knowledge - many people know it and the information does not belong to anyone person but it cannot normally be deduced by you it has to be learned. It is probably talked about in several sources: the world is round, computers contain both processors and memory, OO is routinely used in software construction and so on. If you are sure that it is common knowledge, you do not need to cite a source. Be careful, authors will often write down in their own work things that are common knowledge so quoting them in that instance amounts to saying that a bit of what is common knowledge actually belongs to that author and that of course is an absurdity.

Obvious – many people know it and the information does not belong to anyone person but it can be deduced. It is probably talked about in several sources: companies tend to grow as time goes on, when the sun goes down it gets dark and so on. If you are sure that it is obvious you do not need to cite a source. Be careful, authors will often write down the obvious in their own work so quoting them in that instance amounts to saying that what is obvious to every one actually belongs to that author and that of course is an absurdity.

Published – this refers to an idea that found in a specific source or sources which is not common knowledge nor obvious but is nevertheless useful – in these cases you must always cite the source or sources of such an idea.

Original – you may include freely original ideas of your own. However, be aware that if the reader sees an idea that is not cited and is not common knowledge nor obvious, then they are entitled to believe that either it is a new idea published by you or you have plagiarised it.

5.1.1 Identifying Plagiarism

Plagiarism does not occur only when you copy words verbatim. Plagiarism is about ideas, and even if you express the idea in your own words, you may still be guilty of it if you do not credit the source. However, expressing an idea in your own words might often be good scholarship. The difficulty is that anyone can copy and paste a phrase, sentence or paragraph and cite its source. This is technically not plagiarism, but it's often very poor scholarship since it is obvious that such an activity tells us nothing about the learning, if any that has occurred

Scholarship is about showing your understanding and criticism of ideas. Simply copying, paraphrasing or summarising can only show understanding only to a limited extent. You need to "add value", that is make your own contribution to knowledge, to what you've read and you can usually only do this by expressing an published ideas in your own words and mingling them with your own thoughts and ideas.

5.1.2 Common Critical Devices

The essence then is to infuse your work with your own thoughts and ideas and let these mingle with what it is you have found in the literature. The most common forms of this are:

Interpretation - explaining and expanding on what you have found.

Criticism – discussing in order to judge whether the ideas are good or bad.

Decomposition or Analysis – to tease out the constituent parts of an idea.

Synthesis – by means of discussion and explanation link separate ideas together.

Selectivity - showing which ideas to include and which to discard.

Abstraction - taking an overview or defining a model or framework, usually by looking at examples.

5.1.3 Common Literature Tools

The following are the most common means of incorporating, in a scholarly fashion, the work of others into your own written work (a fuller discussion of these tools may be found in the notes).

Copy – use the exact words using quotation marks. A good rule is that each quote holds a single main idea, which you want to use and then you must introduce it and then follow it up with discussion.

Paraphrase – expressing something that you have found in the literature in your own words - the intention being to simplify, explain, or interpret a complicated idea. But take care there is a very fine line between simplifying, explaining and translating something and just being lazy.

Summarise – producing a précis or abridgment of a part of the source we have found. Essentially one is trying to capture the main points in an argument.

Analyse – the purpose here is to offer a detailed examination of some whole by scrutiny of its parts.

Synthesise – here the idea is to take parts and put them together into a new whole for some purpose.

You might find it useful to remember: copy in order to discuss, paraphrase to simplify, explain or interpret, summarise to capture the main points, analyse to understand and synthesise to build something new.

5.1.4 University Review Assessment

When the University looks at your Literature Review it will be trying to decide if you are committed and prepared for the topic and working at Master's level. If your work is poor in terms of structure, content and form you will find yourself failing. This is NOT necessary so long as you put in the work and ensure you understand how to use citations and the literature. I want to encourage you to do good work - it will ensure that you pass well and it makes your work a pleasure for the Examiners to read.

5.2 Review Content

The review is about your topic area and about you becoming sufficiently expert in it to deal with the problem that you will have uncovered. The intention is for you to offer a discourse that is focused, relevant, authored, measured, evaluative and expressed as a dialogue. (Notice the acronym FRAMED)

Focused – this means that your whole effort is focused on the topic area and the particular aspect of it that you are pursuing. So do not be tempted to add in other things just because they might be useful, interesting, and novel or you just have nothing else to say.

Relevant – any topic area aspect will itself normally represent a large body of knowledge and so one needs to continually ask if a particular element in the knowledge domain is relevant to your particular study.

Authored - any literature review is to be written by its author. This sounds obvious but it is all too easy to fill up a review with cited quotations, paraphrases, summaries and so on so that the 'hand' of the review author is not evident anywhere in the work. When this happens it is not an evaluative review at all but simple plagiarism. The author's 'hand' must guide and direct the review in an evaluative fashion so that the review is a message from the review author and not a recitation of what has been found elsewhere.

Typically this is done by using ones own skills and knowledge to introduce, comment, add to, modify and extrapolate from various primary sources available.

Measured – this is a matter of selecting and using the focused and relevant materials that you have found. Unfortunately, It is all too easy to pack in information in excruciatingly precise detail and so end up with a laboured entry that treats your readers as if they where completely ignorant of the subject area. So here one needs to just say honestly “is the entry a measured response to my and my readers, information needs”.

Evaluatory – authors sifts through the primary sources looking for materials to use. The essence of this sifting is an evaluatory outlook based on an awareness of your problem theme and your topic area. Care is needed because this process is not about searching for materials that you agree with or like in some way. Instead it is a contextualised response (what do you already know) and that may mean you find materials that are new to you, materials that make you change your own knowledge base and often materials that completely replaces what you thought was solid.

Dialogue – a review is a form of argument because good ones are based on a strong theme and in them one is trying to explain to, and convince your readers about something and so it is best if you think of it as a kind of dialogue in which you vicariously challenge them about your review theme and content.

5.3 What goes into a Literature Review

It will depend to a large extent what it is you are working on and what you want to say but the following list give some common ideas of content.

Challenge – this is two way: what you read challenges you and you challenge what you read for validity and applicability and so one might find new ideas or change our perspective.

Consolidation – reading widely consolidates your own knowledge base in that it can confirm or show any gaps in your knowledge.

Exploration - implies searching for new ideas, theories, concepts, rules and so on.

Self Check - affirm what we know for currency and accuracy

Support - the reading might support or be in opposition of ones views

5.4 Integrity and Evidence

This heading sums up research - integrity because it must be your own work and evidence because you MUST be able to show that your results have value. There are basically 4 strands to good work as follows

Dogma – this simply means things you have to take at face value. Most often they are things that are not open to reason in the sense that one is not allowed to question them and in some countries you can find yourself in serious trouble if you do. The problem with dogma is that by definition there is no logical support for it. Just to use a simple example, some faiths require you to have a beard or not eat pork as a matter of dogma – in such cases we usually cannot logically deduce that this is a right or wrong thing. It may of course be simpler than that since we all invent our own dogmas from time to time – for example it may be very simple such as ‘I will never buy a Ford car’.

We all accept dogma but that really is not the issue – the issue is that we should not accept it without some critical thought. There is at least one rational way of exercising critical thought on dogmatic issues and that is asking is the outcome of actions based on it good, bad, neutral or at least does not harm anyone. The trouble however, is that dogma sticks to us like super-glue and we will often go to great lengths to defend it and almost always this is done by sophistry (worthless arguments) and of course the notion of what is good or bad is not easy to define.

Reason – this is the ability to be logical and reason about what it is you are reading or writing. That is you are encouraged to ask questions and seek for a deeper understanding. This may imply that you accept new information, modify what you already know or reject something as no longer valuable.

Honesty – here we are talking about not taking things at face value and being honest with yourself about what you are reading or writing and asking does it all make sense and is it coherent with what I already know.

Motive – this aspect is about your reasons for wanting to read or write something. Now such motives can be high minded or they may be base. One must therefore always guard against tendentiousness (the author simply wants to convince a reader of something and may use any means to do it) in ones own writing and be watchful for it in the writing of other.

5.5 Literature Sources

The available literature is classified broadly speaking into the two kinds described below and ideally we only want to use primary sources.

Primary Sources – that is the first published documents. One can be really pedantic and say the real primary sources are the author's manuscript or autograph but these days we are satisfied with published sources. It will however, often be difficult to establish that something is indeed a primary source.

Secondary Sources – in almost every document you see, there will be elements attributed to other authors – these are then secondary sources.

Be careful not to confuse the above definition with those for primary and secondary data. When we talk of primary sources we are obviously referring to something that is published and exists whereas with primary data it will not exist until a researchers defined, locates and collects it.

5.6 Basic Writing Rules

For Study projects a full literature review will be needed but for Engineering projects the requirements document forms part of the Literature Review. However, even in Engineering it is necessary to write a short review just to form a technical backdrop to your project. It may help you to remember there are two cardinal rules when writing – they are simple:

Respect – always have a deep respect for ones readers and make it easy for them to understand what you are saying.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying. The key task is to formulate ones own ideas, in your own words but one does this by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

5.7 Literature Assessment

When assessing this element the University will look at how YOU use the sources in what you write and at the range of sources that you used. If either is judged deficient your work may not be accepted as the view taken will be that you are not prepared for work at this level and on this topic. It is expected that all your sources will be mostly primary ones. If there is some reason why this is not possible it must be discussed with the Research Methods tutor or your project supervisor.

5.7.1 Literature Review Structure

All the following steps are iterative and you must expect to go backwards and forwards many times before you get a review with which you are happy.

List – Make a list of all the various topic strands that you need to know about. It may help you to think about strands such as: organisational, administrative, functional, social, technological, cultural, ethical and so on or some other structure best suited to you topic. Remember, this is not about writing down everything you know it's about giving your readers a focused discourse on your chosen topic area

Arrange – Use your prepared list above and put the topics into a logical and progressive order.

Theme – Decide on a theme that will link all the various topic strands together.

Structure and Content – Now use your themed list of topics and structure what you write using headings, subheading, paragraphs, bullets, tables, diagrams and so on.

Reading/Writing with the Intellect - This is normally thought of as a four stage process that applies equally to what is written (because it is going to be read by someone).

Understanding – this is simply taken to mean that we understand the words used.

Interpretation – are able to find meaning in the words used.

Evaluation – we ask does the meaning have any value – in essence we ask is it true or false.

Contextualization – this implies that everything we read is coloured by what we already know. This idea is taken much further in the idea of hermeneutics (see the notes).

Usage – the literature that you find and evaluate can be used to supplement your own work and demonstrate your mastery of the topic area. This does not mean that you quote, paraphrase or summarise everything you see. As a rule of thumb: only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation.

Argument - Finally, keep in mind that when writing you are dealing with a form or argument where you are trying to persuade your reader about some point or other and that should only be attempted when you are knowledgeable, the argument is essential and you have a deep respect for your readers.

5.7.2 Literature Review Construction

Here is a plan that you can use to construct your own review. It is not infallible and will require conscious effort from you and it must be based on a thorough evaluation of the literature.

Step 1. Purpose - the purpose is to fully prepare your mind with all that you need to know about the topic area and the particular element of it that you are focusing on. The idea is that what you write shows your mastery of the topic and in fact you have become an authority on the topic area. So a review is not a long list of quotes, paraphrases and summaries, it is an evaluatory discourse. That is, readers will want to know what YOU have to say based around what you have uncovered in the literature - so readers must see what you have found and see what you have to say about it.

Step 2. Topic and Aspect - Make sure you are clear about your topic area and which particular aspect of it you need to explore and understand in order to be able to effectively carry out your planned research.

Step 3. Select a Theme - Use your project problem definition, target and outcome to guide you in selecting a theme that will connect all the various elements of your review together making it a lucid and progressive discourse. (Don't be afraid to alter the theme as you go along if that becomes necessary)

Step 4. Your own Views - Try to make a list of your own views, ideas and knowledge. Remember, the review is an evaluation of what you find not a recitation of it. If all you do is tell us what you have found you may not even pass because almost anyone can write a review on any subject if all that is required is to more or less recite what has been found. So you must structure the review around your theme and your own ideas and thoughts.

Step 5. Make a Review Content list - Based around your theme make an outline list of things to include and then arrange the list into an order that will take you progressively through the topic area aspects. Commonly it is found that it is useful to start as follows.

5a. Basic definitions and terms that need to be clear for the core topic area. (Be careful to note any abbreviations)

5b. Map out several important areas or problem space dimensions. Now it is impossible to be general here so for example if I were looking at mobile devices and their use in business I might map out the following elements: value, attitude, use, limitations, practice cost, ease of use, learning curve, effectiveness and so on. Please be careful here to look for significant things not just drag in anything and everything. Once you have made this list you may add to it, modify it or discard from it as you go along.

5c. Work out how you want to end the review - often this just sums up your point of view but you may have other ideas

5d. You may like to include some statistics if that is relevant. But don't let this run away with you and so the review just becomes some sort of justification based on statistics. Remember, statistics almost never tell us anything about the topic itself and only tell us things related to the relative importance of certain things we have identified.

Step 6. Literature Searching - Armed with your theme and list of elements now start your search for suitable material but be very careful to record the exact details of where everything may be found and checked. The search may start with the Internet or a special tool like Google Scholar but must move on to respected publications.

Step 7. Structure - The step is to structure what you have found and what you want to say about it so we get a coherent and lucid discourse on your chosen subject area. This is not a trivial matter and you must expect to go over it many, many times before it is really an example of your very best work.

5.7.3 Literature Review Traps and Pitfalls

Most of the things listed below are regarded as due to simple laziness and so are unforgivable in a Master's student or indeed any research student and if you are guilty of them then expect severe punishment in terms of loss of marks or failure overall.

Not a justification - A literature review is NOT a justification for your research idea or problem definition. So filling the review up with various statistics will never be regarded as explaining to the reader the topic area and your evaluation of it.

Statistics - Filing up the review with statistics carries no real value in convincing the markers that you are master of that topic area.

Poor Structure - where the review is little more than a few drafts notes obviously written without much thought. To communicate you must impose some structure on what you write else the readers will not be able to see any progression in your thought or in the topic.

Filling up the review with citations - one after the other with no student input. It is correct and desirable to tell your readers what you have uncovered but unless you make comments and add your own views on what is found the work will be regarded as worthless.

Common knowledge and Obvious - Quoting or paraphrasing material that is either obvious or common knowledge implies that you have not looked at the sources beyond the first page or forward. Here is an example from a project document. "Poston (2000) stated that organisation expected ERP systems to deliver improved performance". This is worthless as it is obvious that they would want this and to say it make no valuable point at all - its no good trying to say things like this as if Poston was enunciating some law of the Universe or a point of huge importance on some new and valuable angle related to ERP - no he is just stating the obvious.

Bad citations style - It is very common unfortunately to see the citation form (Briggs, 2000) placed at the end of a sentence or paragraph. When we see this it can ONLY mean that all you have done is paraphrased, summarised or copied that section. This practice is more or less plagiarism and is representative of a very lazy attitude that assumes that just expressing something in your own words is a valuable contribution - its is not because YOU are saying nothing and what you are supplying is not really your own work at all.

Activity Definition - Some students use the Literature Review to tell us what they are going to do in the research. This will result in a zero mark as what is to be done is covered in the Research Design so repeating it here is valueless. This practice is a certain sign of laziness.

5.7.4 Reference and Bibliography

References are to primary sources that you use in the text of your written work. A bibliography is a list of sources you have identified as useful, including references, but not necessarily used. The University will look very carefully at any references to see if you are prepared for study at Master's level in your chosen topic area. Overall, the expectation is that you will list at least 10 sources. For each source you must consider its:

Currency – looks at publication date and be aware of changes in technology.

Completeness – Make sure you are looking at the final version not some draft or abstract.

Uniqueness – is the source a primary one

Coverage – Use your list of sub-topics to ensure that you cover all the areas required so that you are fully prepared. But make sure that you are not including multiple texts with essentially the same content.

Range – Make sure you have a good range of authors.

Authority – ask is the text authoritative. This can be done by considering the author, publisher, writing style and currency. It is also possible to use citation indexes to see how often the source has been used.

Accuracy – Is the information correct? If you cannot be sure then you must not use it.

Relevance – Make sure that your sources are relevant to your project topic.

Usage - The basic usage strategy is:

Find – Relevant texts using a library index, the internet, online book stores and so on.

Evaluate – Once you find a possible source you must evaluate it for content and relevance.

Contextualise – that is fit this new source into your personal knowledge base.

Cite – If you use a source it must be listed in your reference section and cited in the text correctly.

Discuss – You may include something from a source in your work as a copy (quote), paraphrase or summary but in all cases you must introduce it, comment on it at cite its source.

5.7.5 Evaluating Internet Resources

When using internet resources it pays to be careful and always sceptical because of the following factors:

Anarchy - anyone can publish just about anything on the Internet

Validation - authors do not always have their materials checked by an authoritative third party

Tendentious – when the author wants to convince you of something use any means to do it.

Honesty - authors may not always be what they seem and may assume personas, lie or make false claims

Consider – the motives of those who publishing on the Internet

Trust - in research trust nothing until you have good cause to do so. This is the opposite of what we do in our daily lives in that we tend to trust until we have reason not to

Context – be aware of the context of what you find. For example is it a University site, is it a manufacturer and so on.

Accuracy – this simply mean is the information correct. You need to be aware that information might be validly collected but still be quite inaccurate.

Validity – this simply means that we ask is this a valid source in the sense that it was constructed in a reliable manner. Any lack of information on proof readers, editors and publishers means that mistakes are more prevalent than in print and therefore increased scope for innocent error and for outright deception.

Authority – this means was the author competent to create this material. For example any one could have an interest in say Emotional Intelligence and quite easily create an internet article on that subject but it would not have the same authority as that of a University professor who has spent years researching the topic.

Uniqueness – here we are asking is this an original work (a primary source)

Completeness – this may simply be described as asking if the work is the final and finished version. You need to be very careful here else you might find your self using the material from the earlier part of the work which in fact is augmented later in the work.

Coverage – this means what is the scope and scale of the source. Now this does not mean that a source will cover everything on a given topic but it should be clear as to what it is covering.

5.8 Citation Examples

The following set of examples is intended to show some poor use of citations and also some sound ones. These examples should be studied with care by students so that they may avoid inadvertently fall into the trap of using poor scholarly practices. The quotes are from a range of sources and topics and in your study of them you need to concentrate on the form. Now assume all the following were all written by the Research Methods tutor so the comments will be offered in the first person and he is talking to you

These are just simple examples and they do not imply you must use italic or indenting as that is only used here to show clearly the pieces of work being looked at.

Example 1.

Lyau & Pucel (1995) found a link between training and productivity for their sample of Taiwanese car part manufacturers. Bartel (1994) found that training is a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors. Bishop (1994) and Barron, Black & Lowenstein (1989) both found that training increases management estimates of productivity.

This is poor because I only told you what the cited authors said. I did not introduce the author's words, nor discuss them and it's almost impossible for you to see what point I am making other than the obvious one that productivity and training may be linked – in effect it is not my work at all and there certainly is no sense of evaluation here.

Example 2

It has been found that because Arabic words were written by copyists who did not use vowels that over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that it looks as if I attributed the entire paragraph to Noldeke. So you can have no idea which part of the paragraph was my own thought or maybe none of it was. This is bad practice and some tutors even regard it as blatant plagiarism. The fact is that tutors when they see this form in will automatically assume that all the student has done is paraphrase what he has found and none of it in effect is representative of any student thought and will mark the work down because of it

You can use the bracketed form if you just want what amounts to passing reference to a source as in the following example.

In two recent works (Harding 1986a, p.80; 1986b, p.138) it has been suggested that ...

Example 3

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that "change in organisations is an inevitable consequence of growth" – this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdal is clearly obvious and that by Briggs is common knowledge. Also it is not entirely clear that the second sentence leads logically from the first one. The point is that using citations here was unnecessary and therefore worthless.

Example 4 - Suppose you come across the following in a book by Noldeke. But the bit that interests you is by Frederickson – how will you set about properly using and referencing the Fredricksons quote?

Tools are needed if we are to measure software quality in a meaningful way. The idea of quality, as we know, is intangible since many views are possible. It follows that we must define some terms in order to measure quality. It is useful to note what Fredrickson said: "Definitions of what quantities we need to measure in order to assess software quality are at present arbitrary since as far as we know they have no connection with functionality".

This does not mean that they lack a rationale, but simply that professionals disagree on the definitions themselves and so it follows that

In this case the correct way is to find the Frederickson book and use that because it is the primary source. Quoting from secondary sources will only be tolerated in proven cases where the primary source cannot be found or for other reasons is inaccessible and it must be done in the correct manner as shown in Workbook 8 for secondary sources.

Example 5 – Can you work out what the following extract from a piece of student work is saying – if you can please tell us in simple words

It is argued that tacitness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

The sentences is obviously copied as it is very, very unlikely that any student would write with such academic complexity and obscurity – lines like this are not designed to communicate they are designed to impress the reader not further his understanding. What it in fact it is saying is that some skills are very difficult to duplicate and this may mean that growth may be restricted.

Example 6 – Here is a good example and in this case I paraphrase the idea rather than use quotes. Notice how I: introduce the idea, state the idea and discuss the idea and so I weave into quotations, paraphrases, summaries or whatever my own words and thoughts and evaluations.

There has been a long standing problems with some early Arabic manuscripts in that many words have become obscure and even in context they are still unclear. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowel, over time the meaning of some words became lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use "assonance analysis" to study word endings and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes.

5.9 Literature Reviewing Cautions

Writing a literature review is a difficult and time consuming task if it is to be done well and there are no short cuts to sound scholarly work so here are some final pointers.

Laziness - It is very common to see students write down things in a literature review as they occur to them. This practice might be fine for notes but it is obvious that the way thoughts pop into ones mind or information is discovered is most often anything but logical or structured.

Structure – to communicate in writing the work must have an effective structure that is well planned and allows the theme to develop to it natural conclusion.

Pretence - some students try to be scholarly and pack their work with quotations and paraphrases – this then become not an evaluative review of what was found but a recitation of it instead.

Non Review - some students just write down what they know without any references to the literature – this will always lose you marks as no one will believe that you obtained that information by your own brainpower without any outside assistance.

Experience – students often claim that what they write is all down to experiences but again no one will accept that. They way you use experience is in your evaluation of the sources, comments on them and building up your own arguments.

Inclusion – Preparation of the mind for your topic area does not mean you write down everything you know that might be relevant. What it does mean is being focused on your topic area and becoming expert in that. For example, an Engineering project where the literature review contains page after page devoted to telling the reader about every conceivable life cycle is hopeless and in such cases there is almost no thought over what is written and so it is worthless. Similarly, if a study project was looking at eCommerce as a way of selling drugs then page after page telling us about various drugs, treatments and prescribing practices is worthless in the context of just selling drugs. It's not volume is wanted but considered content.

6. WORKBOOK 6 – MAJOR PROJECT ELEMENTS

This workbook is intended to help students formulate clear project elements but here that what is said here is a mechanical process and it is your responsibility to make sure that what is written down makes sense.

6.1 Scope and Scale

Scope and scale are meant to be considered carefully otherwise a project which is out of control and way beyond your capabilities in the time available may occur. Alternatively, the scope and scale may be set so that the problem becomes trivial and the idea is rejected. So please take note of what these terms mean as far as this course is concerned.

Scope – this means something like selection or choice. So for example, if I were looking at training in desk-top packages I might select just Excel or I might select Excel and Access and so on to focus on. The point is I set my scope by being selective.

Scale – the means something like number or extent. So for example if I set my scope as looking at Excel I now need to set the number of users I will include in my study.

Scope and scale are two dimensions that set a frame around your work to bring it into sharp focus and exclude everything else. You need to put limits on both these dimensions but it is most important is to be clear about scope – that is, what exactly to include in your study, normally, just include ONE significant thing.

6.2 Presenting Problem

In any project it is usual to choose an area of knowledge and practice to be its topical focus. For example, one might choose modern usability issues, automated network management, digital paper and so on. Once one has a topic area like this it is necessary to choose a problem theme within it to be a sharp focus for a primary data research effort. It is best if one problem theme is chosen and its resolution or partial resolution would be of strategic business IT significance. In general, it is not all that easy to give a simple and all embracing definition of the notion of problem but the following has proved to be useful.

A problem or issue is something that is a matter of concern or debate within the topic area and whose resolution might bring benefits. (Checkland 2003)

In practice this means a problem is an object not an activity. For example, stating the problem as “how to ride a bicycle” is incorrect since this is not the problem it’s a question about the problem - the problem is “riding a bicycle”.

Another difficulty is that students often write down the problem in such a way that it is an answer or solution to the problem. So for example, if one writes a problem statement as “lack of training” then implicitly that is a solution as well. When this happens it is almost certain that the writer is not thinking about the problem at all but is obsessed with a particular solution. In this particular case the real problem might have been “errors in data entry” and one of many possible solutions is training.

6.2.1 Defining the Problem

It is always quite a good idea to construct one's own definition of the problem and to do it in as few words as possible. Notice, that it is your own definition not one you might look up in a book or on the internet (though you might start with that) because there is often little learning value in just copying a definition as far as deepening your own understanding is concerned.

Remember, that any definition one constructs will not be absolute and universally accepted by everyone - but in research this is not a problem as long as the researcher makes it clear what particular definition is being taken. Do not take this process too far and end up with either over-complicated or trivial definitions - they must be thoughtful and comprehensive. So it is recommended you start by thinking about four things where the acronym CAPE is used:

Characteristics – observable features or facets of the problem idea,

Associations – every problem will have links to other situation elements,

Perspective – when a problem is encountered it will always be from a certain perspective

Effects – say what effects ensue in the real world if the problem is not resolved.

6.2.2 Defining the Problem - Example

Let us suppose that a student has identified the problem theme as Phishing. Naturally, the student will be concerned that this is a good idea and would like confirmation of that before expending time on it. One can

ask the course tutor, but he/she is not expert in everything so at best one would only get an opinion as a response so how should a researcher proceed. So for Phishing a researcher might note the following:

Characteristics: illegal, intrusive, upsetting, preys on those who trust their fellow man, etc

Associations: email, chat, file sharing, etc.

Perspective: management (but try to look at it from several perspectives as well)

Effects: destroys confidences in the system, may lead to personal or company losses etc

Normally, it takes quite a few attempts before a definition that is lucid and comprehensive is obtained. Remember, the definition must also be useful within your research study – that is, it's no good having a well formed definition that does not offer a sound basis for a research effort.

Now here is a first attempt

In the modern world email is a technology that almost everyone uses whether in the home, at work, on the move and indeed it seems to follow one around. Typically, email is a simple one-to-one message passing technology but it is now offered with enhancements that include voice, video, chat, file passing, file sharing where suppliers are attempting to present a complete communication environments. With such a technology come problems and one such problem is identity theft and one way of getting this is known as Phishing. In its simple form an unknown, but apparently authentic, source asks for personal details and then uses them for fraudulent purposes. The problem is identity theft using email systems where a message poses as a legitimate requestor in order to fool the recipient into thinking it is legitimate request. The problem in computer system is known as Phishing.

Here is a final attempt (but most often there are several intermediate attempts)

Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as legitimate request. The intention therefore is to fool the recipient of the message into releasing information which can subsequently be used for fraudulent purposes.

6.2.3 Cautions on Problem Definition

The acronym CAPE is just an aid to formulating a definition so one should not worry whether something is a characteristic or an effect - that does not matter very much because the whole idea is to uncover problem aspects and expand one's understanding of the problem theme.

As a very rough guide one often finds that the final definition must come down to about a third of what we start with. In most cases if one is familiar with the subject it is possible to create a good definition in about 1 to 2 hours and then if necessary update it as your project progresses as it is almost certain that there are elements that have been missed or imperfectly understood.

6.2.4 Problem Size

It is hard to measure the "size" of a problem because there is no scale on which to gauge it. But one can look at two aspects to get some idea.

Current Effects – think about the effects of the existing problem and try to assess their seriousness in terms of the context in which it is set. In simple terms just ask "is it worth solving".

Form of Answer – perhaps a better guide is to think about the form of answer and see how extensive, important and how hard it is to get. For example: one student wanted to deal with password overload – a clear problem with which we are all familiar but his outcome was a set of guidelines on how to construct good passwords but in my view that was a trivial answer to the problem because those guidelines can be found almost anywhere and it is doubtful if that goes anyway to solving the overload problem.

6.3 Project Target

When you think of a problem you normally do it in relation to its effects. It follows that you have to think very early in a project about what effects will be generated if you can resolve the problem – these real world effects are called the project target. Normally one settles on one major target although it is permissible to list more than one. Targets are effects so these are typically introduced by a verb form (increase, reduce, remove, reduce etc) and tend to be such things as: improved accuracy in data entry, to gain infrastructure resilience, streamlined workflow and so on.

6.4 Project Outcome

It is obvious that at the start of a project we do not have its outcome – but we can have some idea what its form may be. Therefore if we know our target we can speculate about what could be generated as a project outcome that might generate or go some way to generating the desirable target. It follows that whatever we

decide is the form of outcome we are looking for in the MSc project it must credibly be able to generate the stated target. Outcomes are objects and so are typically expressed as nouns: Here are some examples:

The target of “improved accuracy in data entry” might be generated by a project outcome of a training needs assessment report or a training plan.

The target is “to gain infrastructure resilience” might be generated by a project outcome of a revised backbone design or a set of recommendations for new technology.

6.5 Problem, Theory (Speculation) and Form

It is often useful when thinking about the solution to a problem theme to think of it as based around or generated by some personal theory a person holds about that problem and its setting. Essentially, one gets at this theory by speculating about causes and possible solutions routes. It is not easy to say how to speculate but it can be said that it is aided by a thorough literature review, personal experience and a deep consideration of the problem theme perceived in a given situation.

For example suppose the situation was related to issues with application software implementations in business not being as successful as expected. Recognition of this problem theme is a first step but if one is to do something about it, it might be useful to thoughtfully speculate on why success is lacking in this area. It follows that one might speculate that this lack of implementation success is due to poor implementation strategies, or poor user training, or poor project management or any number of things. Notice that there will always be rival speculative ideas and that is why one must be thorough in looking at the literature and using your basic knowledge and experience to open up the situation in order to at least have a credible theory as to the most probable solution route otherwise one might just waste time on chasing nothing of value.

Do not let this idea run away – this is not about natural laws of the universe such as Ohms law or Archimedes Principle – here one tries to establish a personal belief about a situation and its problem theme. So after speculation one might express ones personal theory about the above example as follows.

It is believed that implementation of application software is proving difficult and this may be due to poor implementation strategies. It follows that if this is the case and better strategies can be defined then implementations may prove more useful in the future.

Notice that my theory points to a particular form of answer to this problem theme and in this case it is related to perhaps a document that explains how to formulate implementation strategies based on a consideration of user needs, application intention and business objectives.

Occasionally, the theory may be embodied in a scientifically constructed hypothesis but more often than not in technological research it is expressed informally as an idea.

6.6 Primary Data

Primary Data is data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

6.6.1 Primary Data Collection Protocol

Within every project there has to be a collection protocol for the practical collection of the primary data. Every complete protocol will have 5 features:

Vehicle – this is the primary mechanism or technique employed by the researcher, typical examples are: interview, questionnaire, observation, role playing, seminar, focus groups, document searching and so on

Recording Profile – this describes how the data will be physically recorded. Typically we might use: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria –this is a profile that allows the researcher to know that he/she has a valid sample point from which data is to be collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. If we do not have a profile we may not have any consistency in our data and it may therefore be meaningless.

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable.

6.6.2 Project Purpose in a Nutshell

Students sometimes get confused over what a Master's project is about. Consider a topic area like Digital Paper which is likely to be a very hot technology in 2006/7. A Master's project is not about producing a long narrative on Digital Paper explaining what it is, how it is used and what the technological infrastructure to support it might be. A Master's project is about identifying a problem theme in Digital Paper and then collecting and processing primary data into a form that helps you resolve that problem theme based on ones own personal theory. With this in mind, consider the following examples.

Example 1. Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them – is that primary data and is this a valid research purpose? No because in the first place one might just regard the manual as listing the functions anyway so in effect the data already exists, secondly, this is just one book and so its content might be complex, trivial or totally unrepresentative.

Example 2. So if I extract (my basic activity) instances of phishing (my problem theme) from an email log that would be primary data because even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data) as a collection did not. My purpose being to process this collection of primary data to find out the most common sources of phishing and express my findings in an evaluatory report (my form of answer).

Example 3. If I conduct interviews in order to describe (my basic activity) a user purpose regarding illegal downloads (my problem theme) in my company with selected employees the interview transcripts are my raw primary data because the transcripts did not exist before the interviews took place. My purpose being to process this collection of primary data in order to develop a policy (my form of answer) to control illegal downloading activity.

Example 4. If I look through written reports (secondary data) on security violations (my problem theme) for a particular company with a view to identifying (my basic activity) the root cause of each violation then even though the violation reports exist the list of root causes (my primary data) did not so it is primary data. My purpose being to process that collection of primary data to create a strategy (my form of answer) that will alleviate or remove certain kinds of violation in future.

Example 5. If I plan to build an application for processing student MSc marks (my problem theme) then I need to ascertain (my basic activity) the system requirements (my primary data). My purpose being to process this collection of primary data to create a design (my form of answer) for the marks processing system.

6.6.3 Pre-processing Primary Raw Data

In many cases it will be necessary to process the raw data that one collects into a structured form of some kind so that is easier to use when generating the final project outcome. For example, if we have a series of interview transcripts it is obvious, that in that form, they are not easy to use so we might perform a pre-processing phase to get the core data into more structured form that then constitutes our primary data collection before the main processing phase that generates my project outcome is carried out. For example, suppose I examine company documents on misuse of IT system resources by employees. In this case I might proceed in two ways to get my structured primary data collection.

In line processing – that is I define my structure before I start and then as I come across a misuse example I structure it there and then. However, the disadvantage here is that you have to continually look back to see that you are not recoding the same data again and again from other incidents and so it tends to disrupt the collection process and make it longer to complete.

Pre-processing – here I wait until I have been through all the documents and then I use my set of notes to systematically work through the whole raw collection and form my structured collection that way.

6.7 Writing a Research Question (Study Projects)

This is intended to relate to the core problem that your research is trying to resolve. Make sure it is a clear question. Ideally one wants an open question: that is one that does not just end with a yes or no answer. This is often quite difficult to achieve but it can be done if you work at it.

A question is an expressions normally used to request information the form of an answer. Questions can sometimes be like commands used to elicit a response and others such as "Would you pass the salt?" looks like a question but in fact is a request or action, not for an answer. In Research Methods, however we will only look for questions that elicit information.

The simplest questions implicitly or explicitly request information from a range (finite or infinite) of alternatives and these are often called bi-polar questions. An interrogative word is a word used to start a question. In English the following is a list of interrogative words although some of them are rather old fashioned now.

Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.

6.7.1 Questions that are not Questions

It is often difficult to write something that in English could be taken as a question. Now I am sure that in daily life everyone knows how to ask a question but when you write something down you are entering another world. Consider the following two lines – would they be understood as proper questions?

How to sharpen a pencil? Or What a pencil can do for you as a student?

Now these clearly ask for information but if you spoke these fragments to someone they would not quite see it as a proper question – in English such fragments would be understood as a kind of heading to a list of instructions for sharpening a pencil or a list of the benefits of using a pencil.

6.7.2 Basic Research Question forms

It is best when attempting to construct a question to think about what sort of answer is to be expected – now in normal everyday life we do this instinctively. For example, you would not say "is this the right way to Pablo's restaurant" if you wanted actual directions because that question form could only give you a Y/N answer. Instead you would probably say something like "how do I get to Pablo's restaurant from here" and reasonably you would expect an explanation to that question. Broadly speaking there are four sorts of answer:

Bi-polar answers - Essentially questions that imply a limited range of possible answers. Typically, a bi-polar question starts with a word such as WHAT, IS, CAN or DOES.

Is it possible to sharpen this pencil? (Y/N)
Does it make sense to allow children to sharpen pencils (Y/N)
Can a blue pencil be sharpened easily (Y/N)
What is the correct pencil weight for drawing a picture? (HB1, HB2 etc)
What is the common view of staff about using blue pencils? (Disagree, agree, etc)

Bi-polar questions can of course be useful but more often that not they have no great utility and the answer is obviously yes or no. Consider the question: "Can a green pencil be used in place of a red one?" Well of course it "can" be used so the answer is bound to be YES and so the question is pointless. Sadly, questions in this form occur all too frequently in student work and whoever writes such questions is not thinking at all about what information he/she want to elicit.

Explanatory answers – where the expected answer is an explanation and it is often in the form of a procedure or process. Typically, explanatory questions that start with 'HOW' or 'WHY'. For example, "How can a pencil be sharpened safely by young children?"

Descriptive answers – where the expected form of answer is a description most often in the form of an evaluation. Typically, these questions start with WHAT or WHY. For example, "What is the purpose of HB0 pencils?" (a simple explanation) or "Why are HB0 pencils difficult to sharpen?" (an evaluation)

Exploratory answers – where the expected form of answer implies an answer as an exploration of something. Typically, exploratory questions start with HOW or WHY. For example, "How should we use HB1 pencils best in drawing figures?" (often an exploration is needed here leading to an explanation)

Good interrogative words to start questions are: what, where, would, in what way, can, is it, why, which, where, how, does, who, why, do, etc – whatever word you use always ask what form of answer is implied by each of them. You must be sure that whatever form you decide on as answer that you can actually construct it and when it is constructed as part of your research it is in fact useful strategically in some way.

For example, suppose I decide that the form of answer I want is “The role of technological innovation is business success”. Well the task you now have is to now ask yourself whether you know how to express a role (write it down if you like) and whether knowing about this role will be of any use.

6.7.3 Research Question – Why are we asking it?

In normal everyday life questions come at us more or less all the time. Sometime we just answer them but more often that not we have a tendency to ask “why do you want to know”? It is therefore always useful when setting out your research question to ask why you asking it. That is you say to yourself, if I have the answer to this question then there will be some good outcome because of it. Sometimes we embed in our questions why we are asking them but mostly we do not. You will see later however, that you will have to make the reason plain in the aim so one might as well think it through at the question stage as well.

6.7.4 Research Question Form of Answer

For any Research Question there will always be several possible forms of answer arising out of ones personal theory about a problem situation encapsulated in the question. Ideally one would like the research question to be worded so that ONLY one form answer is possible and that is the one our theory suggested but often that is not easy to do so one normally has a range of options and competing theories to choose from so one looks for a form that interests you or looks to have the most utility. Do not be tempted to have multiple questions all in one sentence or look for multiple answers since it is better to focus on one significant output form. Table 4 lists the main forms of answer to help you when considering your personal theory.

Category	Typical Interrogatives	Expected Forms
Bi-polar	does, is, are, what, when or can	A list of possibilities
Explanations	how, why, who or where	A report, a model, an equation, a theory, a design, an evaluation etc
Explorations	How, who or what	A list, explanation, a comparison matrix, a pattern, a survey report, a theory etc
Descriptions	What, who or why	A report, a process or procedure, a model, a policy, a strategy, a theory etc
Table 5. Research Question Outcome Possibilities		

6.7.5 Strategy for formulating a Research Question

There is no easy way to do this and no real templates for it either so a good formulation will require some clear thinking and effort. What follows is a typical structure that you might use, but do not feel limited by it, and neither should you worry too much about the order in which you present the following elements although it would be very odd not to have the interrogative at the beginning (**SPITS** for short)

Spotlight – try to put the spotlight on where the primary data or information needed to answer the question might help come from.

Problem – this is about focusing on a single problem, so try to be as concise as you can.

Interrogative – what is your key interrogative word (how, why, what etc). You should note that some interrogatives need to use two words if a proper question is to be formed. For example, “how” on its own will not normally make a question but when you say “how can..” it is clearly a question.

Target – think about what will happen in the real world if you can resolve the problem. For example, it might be your target was to gain efficiency improvements, provide or enable better communication, increased accuracy and so on. It is also possible, but usually unwise, to state the target negatively if this makes the wording of the question more natural and you will see examples of this in section 6.7.

Suggestion – here one thinks about the problem theme and simply asks what sort of answer and what form it might take. So sort of answer might be yes/no, an explanation, an exploration, a description and these sorts of answer might be expressed at the end of the project as a report, a model, a list and so on.

Here is a good example from student work - "How can the billing cycle time be reduced by identifying and defining best practice in order to improve the quality of response to customers by reviewing the initial accounting processes stages?" Notice here that we have:

Interrogative = what, **Problem** - billing cycle time, **Target** – improved response to customers and **Spotlight** – initial accounting process and **Suggestion** – a best practice portfolio.

It is not always useful to add in the data spotlight because sometimes it can limit ones speculation about causes and solutions and in any case, the spotlight is often implicit in the problem definition. It is also possible and permitted to add in what form of answer you expect to the question but normally I would advise against that in most cases and this is discussed in the next section.

6.7.6 Function of a Research Question

The function of the research question is to crystallise the problem and desired effect (target) of any solution. But doing this is only useful if it allows the research enough room to theorise or speculate about possible answers so that indeed the solution space can be explored. Consider the following formulation:

"What factors influences the development of sound IT project management working relationships?"

Here we have in a solution because we are told that the problem is "working relationships" and what we want as a target is sound working relationships. But we in effect we are told to look for factors and so the solution to this problem theme will be a list of factors. The trouble with doing this is that it cuts off any further speculation about dealing with this problem idea and so the question becomes rather pointless.

6.7.7 Meaning in a Research Question

This section has looked at the structure of a typical Research Question but that is all it is and students must not treat it as some sort of template – it **MUST** be thought out step by step and even then one has to think does it make any sense, is it a focused question, what sort of answer should I expect and so on – there is simply no substitute for careful thinking.

Once you have formulated your research question and have a good idea what form the answer will take then its time to test it using the following ideas. Now be aware that this is just a test of structure and of itself it does not mean the question makes sense – there is no way to do that other than using your own brainpower and common sense – if it makes sense to you it will probably make sense to whoever else looks at it.

English – does it read correctly in English as a question?

Paraphrase – if it's a good question you may be able to ask it in several different ways – so try to do that until you get a formulation you are happy with.

Bi-polar – this means that the question has a fixed and limited range of answers such as "Y/N", "bad", "good", and "excellent". This type of question can of course be useful but the problem with them is that such answers do not have much utility – that is they do not tell you anything of value in terms of what action or actions you might take. You are advised to avoid such questions for your project.

Discussion – look at your question and honestly ask 'will this question produce discussion?' – what this means is to ask 'who am I writing this question for and would it interest them'. Try not to think that you are doing this for your Research Methods tutor but try to think what you would do if you were trying to get funding for research to get an answer to the question from someone.

Answer Form – try to work out what form or forms the answer will take (typically: bi-polar, explanation, description or an exploration) – if you try to avoid this aspect you may find yourself in serious trouble with your research.

6.7.8 Common Errors in Research Questions

The following are typical errors found in student written Research Questions – they can all be avoided if one takes just a minute to think through what has been asked and what sort of answer is likely.

Not a Question - to an English speaker the following would not sound like a question, instead it would sound like a heading to a list of instructions or a procedure. "How to make business application development productive at XYZ Corporation?"

Multiple Questions – It is never a good idea to try to put TWO (or more) questions into one as in the following example - one is about testing and one is about bugs they are quite different things. "How can software bugs be minimised and the testing cycle shortened in the development process of an Inventory System?"

Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example and it is easy to see that the answer to the question is bound to be YES - of course a productive work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this. Similarly, it is easy to explain how a better development process can increase productivity.

"How can a better business application development process increase the productivity at XYZ?" or

"Can a productive work-life balance be achieved with telecommuting for technical personnel?"

Please remember that it is possible to write a very poor question that exhibits more than just one error type. Again, there is simply no substitute for thinking about what it is you have written.

6.8 Primary Data Generation with BAGeD

Based on a problem theme, theory and the form of the project outcome expected one needs to formulate a process to create a unified collection of primary data. There is no algorithm for doing this and one has to go carefully through the steps: define the data (BAGeD), locate the data and decide on a protocol to collect that data reliably.

Spotlight - The core of this primary data generation process is to find an activity whose execution effectively points to the right data so that you can formulate the whole collection plan around that activity. This core activity is called a Basic Activity for Generating Data (acronym BAGeD) and is the activity that one performs to generate the primary data that you want. Think of the BAGeD as a sort of spotlight that is focused just on the primary data that one needs and nothing else. That is the spotlight illuminates the data that you want in the sense it tells you how to generate primary data items but not how to actually collect that data.

With a BAGeD it is ideal if you can find just one verb to describe the activity. One needs to be careful here that the activity is clear since almost all verbs need to be qualified or supported by stating what the object of the activity is. For example, if I were to say, "look at fault logs for my primary data" then that is very indistinct because it does not tell us what to look for (the object of the looking). But if I say, "look at fault logs to describe instances of SPAM attacks" then I now have a more distinct activity because I know what I am going to write down as my primary data. The whole primary data collection process is then fitted around the BAGeD and the detailed planning to get the necessary data can then be made.

Example - suppose the problem theme is the value of training. Clearly a lot of money is spent on training so it might be really useful to know if there is a link between it and productivity. Suppose we speculate that the link is to do with essential business working practices and these change over time to meet new needs so that what I need is an answer in the form of a process model on how one identifies changes in business essential working practices and links them to a training initiative.

Now that I have my theory and form of answer (a process model) the Basic Activity for Generating Data can become **describe changes in essential working practices** of key operational staff – thus, my Basic Activity is "**describe**" and the Primary Data will be **changes in essential working practices**. In practice you might try several ideas before you are happy with one. Now I have this core activity I can work out the full process of getting to the data and processing the resultant collection to get my process model (outcome) that describes the link between business essential working practices and training.

Once the BAGeD is clear it, is an easy step to say how that data will be collected. In the above example I might use interviews with relevant staff. In summary the whole process becomes **describe changes in essential working practices** (BAGeD) using **interviewing** (collection protocol) with relevant staff.

6.9 Getting a BAGeD

The Basic Activity for Generating Data (BAGeD) then is an idea that allows you to spotlight exactly the data that you want. So we are looking for an activity and we hope that activity will shine a spotlight on the data. There are only three real considerations:

Problem Area Expertise – it is obvious that you need to have gained expert knowledge in the topic area and in the particular aspect related to the problem theme you are dealing with. In general, depending on the topic, this might include things such as: knowledge of the technology, management and usage processes. Unless you have thoroughly prepared by using literature reviews and/or other means you will simply not be in a position to know enough to be able to decide competently what data it is possible to collect.

Intended Outcome – fix in your mind what your Research Design is trying to generate as an outcome. With the above in mind, recall that whatever data you collect will be first formed into a structured primary data collection during the pre-processing phase, which follows immediately after collection, and then that structured collection will be used to generate your outcome.

Let us suppose the outcome is to be a set of guidelines, so you have to think what sort of primary data is needed to be able to generate the guidelines. This means you must know what guideline means and how one is constructed and that is where secondary data comes in. So in this case you might look at text books or journal articles to find a guideline model to use. Additionally, you would look at examples as well as look at any relevant company or international standards.

Collection Protocol – the last thing to consider is can the data be collected and if it so, what is the best way to do that. So it's not a matter of just choosing anything that comes to hand, it is a serious practical consideration based on a thorough and logical analysis of the sort of primary data that you want.

In the guidelines example above, the idea might be to use a questionnaire and one has to ask would a questionnaire allow for the collection of the data I needed. Let us suppose that the data we spotlight is: IT media and usage. Now it's obvious that a questionnaire can easily get media data but it is not clear how it could capture usage data so I might decide to get that information by interview instead because I want a much richer picture there. The point is that guidelines are largely about usage so that is where I must direct my effort.

To elaborate, usage is a complex issue and if you try to get it with a questionnaire you are going to have to have a very good idea what the usage processes are and so it may miss lots of things that are going on in the company setting. Whereas, if I use an interview, I have much more opportunity to explore the usage idea and that is what I really want.

6.10 Research Question, Form of Answer and BAGeD Examples

Consider the following further examples which focus on the BAGeD (your data spotlight) and linking it with some theorising or speculation about an expected form of answer. In each case several possible forms of answer are listed but in a research study only one would be chosen for further work.

One needs to be careful – this all sounds fine, even clever but a researcher must seriously consider if a complete process built around the BAGeD can be formulated in order to get at the necessary data within the time and other resources that are available.

RQ = What limits investment into e-applications for SMEs in Hong Kong leading to a loss of competitiveness?

- A list and description of investment constraints or
- A strategy to deal with the investment constraints or
- A feasibility report on e-application implementation or
- A post implementation review report or
- A prediction reacted to the effects of the constraints

Let us suppose that I choose a list and description as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on reviewing investment plans and the corresponding strategic plan in order to identify (Basic Activity) the possibility of an investment constraint (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect investment and strategic plans (secondary data) and by a process of review I identify and extract key investment decisions in the investment plan linked to a strategic plan. So my primary data will consist of a list of identified investment constraints, which I will need to explain.

RQ = How can IT operational criticality be monitored and controlled in order to build effective business systems?

- A process of data criticality categorisations or
- A user guide to data criticality or
- A DRP/BCP policy document or
- A report explaining how data and criticality are related

Let us suppose that I choose a DRP/BCP policy document my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on listing data categories and using these categories I review reported critical incidents related to data categories in order to match (Basic Activity) the category to the criticality of the incident (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect category data (secondary since they must exist in this case) and collect incident reports (secondary data) and by a process of evaluation of each report extract incident details and categorise them (my primary data). So my primary data will consist of a list of categorised critical incidents.

RQ = How can supply chain logistics be improved to provide continuity in manufacturing systems?

- A evaluation of a modern supply change process or
- A feasibility report on RFID or
- An implementation plan for RFID or
- A model that shows how improvements may be made using RFID

Let us suppose that I choose a list of implied benefits all explained as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on describing (Basic Activity) supply chain tracking problem themes (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify tracking problem themes and by process of evaluation of each problem theme I analyse how RFID might alleviate that problem theme. In essence I extract key reported problem themes and possibly categorise them (my primary data). So my primary data will consist of a list of categorised problem themes in supply chain tracking.

RQ = How can an improved personal communication protocols be established leading to productivity and business success?

- A feasibility study on IM and its use in offices or
- The definition of a training programme or
- A series of factors that must be in place before IM adoption or
- A cost/benefits report or
- The design of a regular monitoring scheme to assess effectiveness

Let us suppose that I choose a cost/benefit report as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on analysing (Basic Activity) call content with regard to costs (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify the sort or calls and then extract the cost (easy) and assess the benefit (hard) and by process of evaluation arrive at my report. So my primary data will consist of a list of calls and their associated cost and benefit.

6.11 Writing an Hypothesis

This matches with your research question and amounts to you saying what you think to be true in a given situation. It is in essence an extension of your form of answer where you try to say not only the form but what you think the answer will actually be. When you do this your work then become a process whereby you try to show that your hypothesis is valid. It is quite difficult to write a suitable hypothesis. There are three stages: firstly write the null hypothesis, secondly write the alternative hypothesis and lastly write down the dependant and independent variables. Unfortunately many new researchers seem unable to do these things satisfactorily. Let me illustrate.

A student wanted to write a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (Dependent). Now this will ONLY makes sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified. Now in research people tend to treat the idea of hypothesis in two ways and the second way is often quite valuable in many research situations.

6.11.1 Formal Experiment

To set up a formal experiment one creates or identifies two samples: one exposed to some effect and one not. For example, suppose I were looking at whether a new diet called lose-weight-quick worked or not. I could set it up a hypothesis and look for samples where some people were exposed to the new diet and some were who were not. The experiment then amounts to seeing if there is any significant difference between these two samples. (See notes for how to set up a formal hypothesis)

In a sense we are trying to prove the diet works but that notion of proof needs very careful understanding. The point is that it is very likely that the diet will work for many in the sample and not work for others. So our proof carries a qualification which is that all we could reasonably say at the end is that the diet is likely to work for a large number of people (or not as the case may be). A second point is that we do not usually do thousands of similar experiments and so at best our results for a limited sample would be tentative. Notice that this outcome is quite different from an experiment that sets out to verify a natural law like Archimedes principle or Ohms law where the amount of variety is much, much less and of course such natural laws have been tested many thousands of times so we are assured of their validity.

6.11.2 Informal Idea

Instead we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies to demonstrate this. Notice that we are NOT proving anything here only suggesting that something may be true.

6.12 Writing an Aim and Objectives

For each project we want one overall aim and a set of objectives that collectively will generate the form of answer that has been defined (project outcome). An aim/objective is expressed as an activity to get to a defined and measurable outcome within the scope of the project. The essential difference is that the aim expresses the target (or purpose) for the whole project outcome whilst objectives perform the same function within the project itself. Every time you write an aim or and objective you have to ask three main things with the abbreviation JOB – so when you write an aim or objective make sure you do a good JOB of it.

Can Justify – this really amounts to asking if the aim/objective make sense in that it generates a minor project outcome within a particular aim.

Can Observe - Make sure than someone else can observe or check what you have done, normally this means you can document it in some way (in words, diagrams, charts, graphs etc) in your project document. For Engineering projects this also means that the application is visible to all markers.

Can Build - Make sure that YOU can build the outcome stated.

6.12.1 Project Aim

This derives from the project problem definition and is best thought of as expressing the overall activity and intention of the project to generate an outcome that can be placed in the project document or made easily visible to the examiners. It has a number of elements as follows although when you write your aim you do not have to do it in the same sequences as expressed here and you may write it in any way that best captures your ideas although doing it in this sequence tends to be more logical.

You will note in the aim structure that follows that the problem theme is not explicitly mentioned and we infer what it is by looking at the target. The reason it is not included explicitly is that when one does one tends to get very awkward constructions linking problem and target so we might see absurdities such as “to improve website accessibility because web site accessibility is problematic”. The structure of a good aim is as follows where we can use the acronym ASOT to remember it.

Activity – what must be done with the available data to get the project outcome? Ideally, look for a single activity that sums up the whole project process for generating the intended outcome.

Spotlight – where will the basic data used by the activity come from?

Outcome – this element says how the project outcome will be expressed knowing that this outcome will later be used to generate the real world target. If the Research Question expects a model as an answer then the aim must have the same form of generating the model. Similarly, if the application description states a system to do X then the aim must have the intention of generating system X.

Target – what is the real world intention? That is the project outcome should be useful in the sense that it addresses the real world problem theme on which the project is based.

Aim – to create a website structure design using cascading style sheets in order that it might be used in design to improve web site accessibility.

Activity = create, **Spotlight** = cascading style sheets, **outcome** = web site structure design and

Target = to improve accessibility.

Sample Aim 1 – “To create an improved network infrastructure”. This is unsatisfactory because we have no target - we know that there will be an improved infrastructure but we don't know what effects that will have. So is improved infrastructure the outcome – it cannot be because it would imply sending to Portsmouth for marking some object called “improved infrastructure” and that is an absurdity. So here we have no target and no outcome and we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

So if I just use the above example it would be possible to have a target of a reduced network down time because of the Improved network infrastructure but that could ONLY happen after the project completes and in the project one could generate an infrastructure design - now that can be completed within the project period and later used to build the infrastructure which can then be used to generate our reduced network down time. Another factor here is that we cannot measure whether something called improved network infrastructure (what scale would we use?) has been achieved unless we have a target such as reduced down time which of course we can measure.

Sample Aim 2 – “To build a Wi-Fi implementation strategy”. This is unsatisfactory because although we know the project outcome is an implementation strategy we do not know what value it has in the real world because we have no target. Notice also we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

6.12.2 Project Objectives

The aim expresses the overall outcome for the project but to get there we normally have to pass through a number of minor outcomes on the way and these are expressed as being generated by objectives. For example, an objective that sets out to build a model of the software construction process could easily be a minor outcome for a project dealing with the construction of web sites but could also stand on its own in the sense that is a useful outcome whether the project is completed or not. Conversely the design of a set of interview questions is most likely not to be an objective but a simple project task since it is something that needs to be done but only has meaning within the project.

Since we are looking for minor project outcomes that collectively deliver the project outcome we have a little problem here because any project is made up of a series of tasks, some of which will generate a minor project outcome and some will not. For example project tasks range from preparing the contents list to evaluating the project outcome. A possible rule for deciding if a task leads to an objective is:

Ask is the object produced by the task something that could stand on its own outside the project and in that sense valuable in its own right?

If the answer to the first is “Yes” then it is likely to be a task that leads to an objective. Please take care; this is just a “rule of thumb” so look for things as minor outcome that are real milestones to getting the project finished. It may be useful to think of the project as a pyramid where the final project outcome is at the top and below it are layers that have been generated progressively from objective minor outcomes so that we eventually get to the top.

The format for an objective is much the same as for an aim but with no target and two added features in that they must be progressive and bounded. There is only one aim but there may be from 3 to 6 objectives that show a progression that leads us to the overall project outcome.

Progressive – objectives must build sequentially so that collectively they amount to reaching the aim.

Activity – Ideally we look for a single activity that will generate a minor project outcome that can be expressed in a form that can appear in the project document

Spotlight – what is the data area focus of the objective's activity?

Outcome – In this element you say how the outcome of your objective will be expressed knowing that this must be in a form that can be written into the project document.

Bounded - objective outcomes must be achieved and available within the project period and must not refer to anything that might occur after the project document is completed and submitted

Example – To model and document the software development process.

Activity = model, **Spotlight** = software development process, **Outcome** = a document, Bounded – yes we can do this activity within the project period (in this case we cannot show progression as that only applies to the complete collection of objectives)

It is easy to become completely muddled with objectives and one source of this muddle is the distinction between a project objective: one about what a student can do and evidence in the project document and operational ones: those that have some real world effect that might happen after the project has been completed. In simple terms if you set an objective in your project it must be completed within the project's time scale. Let us just take an aim and look at some possible objectives.

Aim = To report on how the bicycle is an aid to mobility in a modern urban environment

Sample Objective 1 – “To list in a report the components of a modern bicycle”. This is fine since clearly it is something that you can do and evidence in a project document so somebody else could check what you have done.

Sample Objective 2 – “To describe how a bicycle functions”. This is no good since although it is clear that you can develop a description, no one can check it unless you write it down. Better to say “To describe by means of annotated diagrams how a bicycle functions”

Sample Objective 3 – “To understand how a bicycle helps urban workers”. This is no good because although you can do it no one else can check it. Better to say, “To prepare a report explaining how urban workers could be helped by the use of a bicycle”.

Sample Objective 4 - “To ensure that workers get to their office on time by using a bicycle”. This is no good because you cannot do it and if you cannot do it no one can check what you have done. It also sounds more like an aim than an objective because it hints at a target. Better to say “To report on bicycle usage strategies that might be applied by urban workers to ensure they get to work on time”.

Sample Objective 5 – “To implement a bicycle repair system”. This is no good since you can clearly do it but it cannot be checked in your project document. But you could say “Report on the implementation of a bicycle repair system” or “Produce a design document for the creation of a bicycle repair centre”.

Sample Objective 6 – “To ensure that bicycles conform to BS 7898”. This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written “To prepare a report showing how a bicycle can be evaluated for BS 7898 compliance”.

6.13 Words needing care in Aims, Objectives or Research Questions

The key thing is to look at the main verb (activity) you are using and ask ‘does it tell me what to do as a practice’, if not then its use is suspect. A good way to assess if the verb is strong enough is to connect it with an outcome. So we might write ‘Create a framework...’ – here we have the activity ‘create’ and the ‘outcome’ a ‘framework’ and it is easy to see that it can be done.

6.14 Writing a Title

The title is the name of your project – rather like the name of a novel, something that catches a potential reader’s attention but just gives a hint as to what the work is all about. Think of it as a kind of nickname or slogan for your project and as such it is not a good idea to try to use the same set of words for the title, Research Question and aim. Titles typically have two elements:

Aspect – this is the particular focused area of your study

Why – this says why it might be a useful aspect

Mentioning the means by which you solved your problem should only be included in the title if it is crucially important. As an example, suppose your project was concerned with the development of a database and you used Microsoft Access. Unless your project compared your product with a similar database implemented in Oracle, say, then the tool you used to solve the problem is not as important as the problem you set out to solve.

Be careful with titles, there is a tendency to use the title to say what you will do. The purpose of the title is to give a concise name to what you do. Avoid noise words or phrases such as: “A report into...” (redundant: of course it is a report!) or words like “study”, “investigation”, “enquiry” and “development” are often similarly just noise. It is also usually very unwise to express the title of your project as a question although a title in the form of a proposition is often quite useful as in example 1 below. Here are some examples of good titles:

Planar Similarity – A Possible Software Quality Measure
Heuristics in the Stages of Soft Systems Methodology
A Taxonomy of Heuristic Problem Solving

7. WORKBOOK 7 – BASIC RESEARCH METHODS CHECKLIST

In research we are usually trying to do one or more of the following: understand something, explore something, describe something, explain something, improve something, build something or prove something. To do any of the above, you will have to decide what data you want to collect and choose rationally a research method as your primary research vehicle and build a research design around it.

You need to exercise care here so as not to become confused between a Research Method, which is a framework or model for the whole research project, and Data Collection Protocols, which are vehicles for actually collecting the primary data and might include such things as interview, observation, questionnaire, seminar or role playing.

What follows is just a summary of the methods and further information can be found in the associate project notes and there are many books available on each of the methods listed below. There are many research methods but the list below presents the major ones.

7.1 Research Styles

This is a practical notion and you would be wise to think project ideas through in terms of these styles. There is no sense that one or other is superior and no reason why both should not be applied at the same time.

Quantitative – a style that represents information in numerical form. The numerical form might be graphs and statistics which can be used to show trends, comparison and similarities and the graphs might lead to equations which link variables or allow one to make generalisations.

The advantage of quantitative data is that there is solid evidence that can be permuted in a variety of ways to support or not support a contention. In general, one is counting the frequency of some event – say the number of times the user selects the wrong icon but, and it's a big but, the data is only truly valid in the context in which it was collected so one needs extreme care if we want to generalise.

Qualitative – is typically used to analyse how certain actions occur not just how often they occur. The information is usually represented in textual form of some kind as a description of some observable event or events. The usefulness of this is that it exposes the thought processes or reasoning behind a particular behaviour – why a user clicked the wrong icon. However, it does make the analysis and representation of the data more complex.

Although these are defined, in practice one does not usually start by thinking about the style and typically as you think about the problem and what primary data your research will collect to deal with it then it tends to define itself as predominantly quantitative or qualitative.

7.2 Research Approaches

There are two broad approaches to research, which is always essentially exploratory. In practice you do not decide the approach as such and it will effectively be decided for you when you formulate your research problem and construct your research design. However, we may loosely define:

Deductive – in the sense that we have a theory that we want to prove – in simple terms deduction amounts to a valid argument – that is if its premises are true then the conclusion automatically follows. Typically we form what is known as a null hypothesis. That is we set up our research question in the form that there is no effect of some parameter. For example, I might want to look at the significance of scripting languages on system development time. I could do this by setting up a null hypothesis that says 'I contend that the use of scripting languages have no effect on system development time'.

Inductive – in the sense that one hopes that the theory emerges from the data analysis as we go along. It follows that we don't have a hypothesis we just know that we want to explore a certain domain to see what emerges. For example, I might want to investigate the fact that students are not attending chat sessions but I have no idea why (I don't have a theory) so the whole point of doing the research is to explore the issue implied by the question and hope that something will emerge as I go along. So induction is a kind of grounded argument, the truth of whose individual premises would not *guarantee* the truth of its conclusion, yet one hopes that it would provide some evidence for it.

In short we might say that deduction is an outlook we take when we are sure that we know what the outcome is going to be but Induction is an outlook we take when we can only feel probable about a given outcome.

7.3 Research Outlook

Before we look at the various research methods it is useful just to records that there are two approaches that are available to a researchers.

Hypothesis Driven – this is the classical research paradigm where we have by some means devised a theory or speculation of some kind and the research is then directed at trying to show that the theory or speculation is valid. For example, we might theorise about who buys Gel Pens and then try to show that it is true, or more usefully try to explain in a report why it is true

Data Driven – it often happens that when we embark on research we don't have a hypothesis which we are setting out to test. This is very common today where corporations have vast databases and want to see if there is anything useful in there that might for example lead to competitive advantage. It follows, that in these cases we don't start with a hypothesis but we examine the data sets looking for patterns or outliers or indeed anything that might allows is to formulate a theory of some kind. For example, we might look through millions of sales transactions and then to hypothesise that people who buy Gel Pens all have beards and wear glasses. If this theory is true we can better target our Gel Pen products.

7.4 Which Method to Use?

There are many methods/models that we can use for setting up a research idea, the most common being: case studies, vignettes, action research, experiments, quasi-Experiments, surveys, biographies/histories, grounded theory, ethnography and requirements gathering. It is never easy to decide on a method or perhaps more than one method, but the following may help you to make up your mind. Start by asking what exactly are you trying to do or find out? This will help you decide whether you need a qualitative or quantitative approach. So here are something you might consider:

Choosing a method will depend on many factors such as: context, available literature base, basic research purpose, is the domain changing rapidly, time available, skill available, sampling and other practicalities, access, your personal stylistic inclinations, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on. Notice these factors are almost all about practical things - the whole point being that a design has to be carried out and that means it has to be practical.

7.5 Research Basic Purpose

In research, usually we try to do one or more of the following: understand something, explore something, describe something, explain something, illustrate something, improve something, build something or prove something. It is therefore very important when you are trying to decide on a method to keep this basic purpose uppermost in your mind.

7.6 Rationale: Case Studies

The case study method focuses on just one, two or twenty examples – such as your place of work, or one element of your organization or several aspects of a problem area. Typically:

1. Case studies are commonly used to **illustrate** or **understand** a problem or **indicate** good practice.
2. Case studies always have a context so make sure you are aware of it.
3. Case studies are usually qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain or describe some activity or phenomena.
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. There are broadly speaking two ways to begin case studies. This first is that you can set criteria and then go looking for relevant cases or secondly you can design and create the cases.
7. For most case studies there is usually be a longitudinal element - that is the cases will run over a fixed time period and you will periodically visit each case to collect the data.
8. There are several kinds of case possible:

Unique – implying that the setting and context are extremely rare and there may no be another chance to study this problem area again.

Critical – implies an important theory that you want to test and a particular case fits that profile.

Representative – implies that the case profile represents a typical or everyday situation.

Revelatory – implies that the case profile allows a researcher to study a situation never before looked at in detail and its context may be come common.

9. In practice you can use the following to organise your cases but remember once you have your case design you will need permission from whoever is necessary.

How many cases – be practical because there are time limits.

Case Criteria - add as many criteria as you think necessary to pin down the data location but don't have so many that you will never find a case that fits.

Sample criteria (collection protocol) – add as many criteria as you need to pin down a particular sample point where a unit of data can be obtained.

Visit Frequency - each case must be visited to get the data so work this out by looking at how much total time is available for the study.

Data collection Vehicle – by observation, interview, document analysis, etc. You will have to have a protocol to say when a valid sample arrives.

7.7 Rationale: Vignettes

These are perhaps best thought of as micro case studies or snapshots that illustrate just one idea and almost always are qualitative in their application. Typically:

1. Vignettes are commonly used in research contexts where actions, motives and judgements are to be explored, often in sensitive situations and you want to extract and **describe** examples or **illustrations** of significant elements in that problem domain
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain, test an idea or describe some activity or phenomena.
5. Typically you cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept. Therefore, this may also be useful when only a small sample is possible.

7.8 Rationale: Action Research

The main purpose of action research is to improve identified practice in some way. Typically:

1. Action research is commonly used to conduct research at the workplace with a strong desire to **improving** aspects of your own or colleagues' work so
2. In this kind of research you must be in control of events and they must be contemporary.
3. Typically indicated as useful when the research question starts with 'how' and there is a desire to explain something and use that explanation to improve practice.
4. Because of its setting, it is obvious that the research design is linked closely to its context.
5. The whole point of doing action research is the research leads to change in practice.
6. The working strategy is: plan something, do something, observe the something and reflect on what has happened as a result of your actions.

7.9 Rationale: Experiments

This form of research is used where there is a hypothesis and an associated variable that you can control (the independent variable) that will produce a change in some other variable (the dependent variable). That is the whole idea implies that you can intervene by altering or controlling the independent variable. Typically:

1. Experiments are commonly used when you want to **prove** or at least **indicate** that something is true. In practice proof is very difficult as it would imply that your findings are true for everyone, everywhere and for all time and so then tendency is to say indicate rather than prove in most cases.
2. In very simple terms one forms two groups: one which is exposed to the intervention and one which is not and then we observe if there is any difference because of the intervention.
3. Typically indicated when the research question starts with 'how' or 'why'.
4. The researchers must be in control of the events being looked at and they must be contemporary.
5. The biggest risk is that there may be other variables involved which we are not aware of.
6. It is difficult to be sure that our sample is representative.

7.10 Rationale: Quasi-Experiments

This form of research is used where there is a hypothesis and associated variables but you cannot control any of them. It would be nice to think we always had time and resources to run a carefully designed experiment but unfortunately this is often not the case. In an experimental design one chooses the samples involved randomly and thus one has control. However, it may be that data already exists and you can test your theory on that existing data or it may be that you simply cannot get control over all the variables that you want. So an experiment and a quasi-experiment are very similar it's just that the quasi-experiment does not quite have all the trappings that a full experiment has.

7.11 Rationale: Surveys

This form of research is used when we want to ask a group of people a question or questions. Typically:

1. Surveys are commonly used when one needs to get and express an overall **understanding** of the properties in a given domain.
2. One could of course also survey 'things' as well as people.
3. Surveys lend themselves to future replication.
4. Typically indicated when the research question starts with 'who', 'what', 'where', 'how' many' and 'how much'
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. Questions must be well-designed and unbiased and may be asked by interview or questionnaire.
7. Be careful to distinguish questions that are asking for facts and questions that are asking for opinion
8. The results will be very dependant on having a big enough and representative sample.
9. Be clear as to how the data will be collected – by observation, interview, questionnaire, etc. You will have to have a protocol to say when a valid sample arrives.

7.12 Rationale: Biographies/History

This form of research is used when we want to trace an historical event and analyses/evaluate its history as this may lead to insights or explain certain action so that lessons may be learned.

1. Biographies/History are commonly used to form a **description** and **explanation** of events.
2. One can use this to look at individuals or organisations or even technology.
3. Typically indicated when the research question starts with 'what'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. Be clear as to how the data will be collected – by documentary study and interviews are common.
7. Histories are naturally chronological and are characterised by epiphanies (pivotal events) and almost always exists in a context.

7.13 Rationale: Grounded Theory

Here the main idea is to use research to arrive at a theory based (grounded) on collected data. Grounded theory is quite difficult to understand and practice.

1. Grounded theory is used in situation where the theory is unclear or even unknown and so there is a need to **explore** seeking **description** and **explanations** in a domain.
2. One can use this to look at organisations or technology.
3. Typically indicated when the research question starts with 'why'.
4. You cannot control the events being looked at but the events need not be contemporary.
5. This is typically a qualitative study.
6. Be clear as to how the data will be collected – by documentary study, interviews, questionnaires etc.
7. Grounded theory is systematic in that the idea is to gradually move closer to a position where we can suggest a theory or proposition.
8. The basic unit of research is the category which is something that may represent a unit of information and might be almost anything.
9. The essence of grounded theory is in its data processing where various forms of coding are used to gradually unlock meaning in the data.

Open Coding – essentially the formation of the initial categories of information – it is characterised by looking for properties or asking when the something is a dimension of the research space.

Axial Coding – this is about trying to assemble that data after open coding. This can be done by using a diagram or some logic that connects things or looking for causes or looking for contexts and consequences.

Selective Coding – here the researchers invents a plausible storyline that integrates the categories in the axial coding model.

Matrix – a final step (though often omitted) is to produce a conditional matrix that is supposed to make clear the social, historical, technological or economic conditions that prevail in a situation.

Theory – one hopes that as a result of all this processing a theory will emerge which of course may go on to be tested by a formal experiment.

7.14 Rationale: Ethnography

This form of research is used when to immerse ourselves in the day to day life of an organisation or group. In this context ethnography is a description and interpretation of a cultural or social group.

1. Ethnography is commonly used when we want a reflective **description** expressed in an **interpretive** manner.
2. One can use this to look at individuals but more typically organisations.
3. Typically indicated when the research question starts with 'why'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. You may alter the events being looked at because you are normally a participant observer.
7. Be clear as to how the data will be collected – by participant observation.
8. Ethnography is about immersion in a culture: behaviours, language, structures and functions.
9. In such studies one often encounters gatekeepers, key informants and communication relies on a sense of reciprocity by investigator and his subjects.

7.15 Rationale: Requirements Gathering

Requirements are simply a statement of a systems service (what it must do) or constraints (what it does not necessarily do). In practice saying what a system must do is often extended to how it will do it. This method is a form of action research but it differs in that the only contact one has with the people involved is at the requirements stage and possibly at the implementation stage though this may vary depending on the systems life cycle employed. You should use this method when you are setting out to build an application of some kind such as a computer application. There are 4 stages of requirements.

Functional Requirements - These are requirements that say what a system does or is expected to do. Typically this would involve or include most of the following: process descriptions, details of all inputs/outputs and details of all the data that must be held in the system.

Performance Requirements - This is usually understood to mean requirements that describe aspects of the system that are concerned with how well it provides the main functional requirements. For example: performance criteria such as response times or how long it takes to print a report, data throughput and storage needs and security considerations.

Technical Requirements - This aspect of requirement looks at the tools and method used to build the system. For example, it may happen that you have to use a certain database package or for other reasons you need to select a particular scripting language and so on. More often than not this aspect amounts to looking at technical constraints that must be applied in building the system.

Usability Requirements - Requirements that ensure that there is a good match between the system and its users. In most cases usability is expressed in terms of measurable objectives.

7.15.1 The Requirements Document

The system and software requirements are usually documented in a formal manner so that ones understanding may be communicated to customers and system builders. The requirement document describes the following:

Services and Function – that the final system must deliver.

Operational Constraints - under which the system must operate.

Development Constraints - on the process used to develop the system.

Properties of the system - in the sense that it may have unplanned additional functionality.

Links - definition of other systems with which the system must integrate.

Domain - Information about the application - for example how to carry out certain tasks.

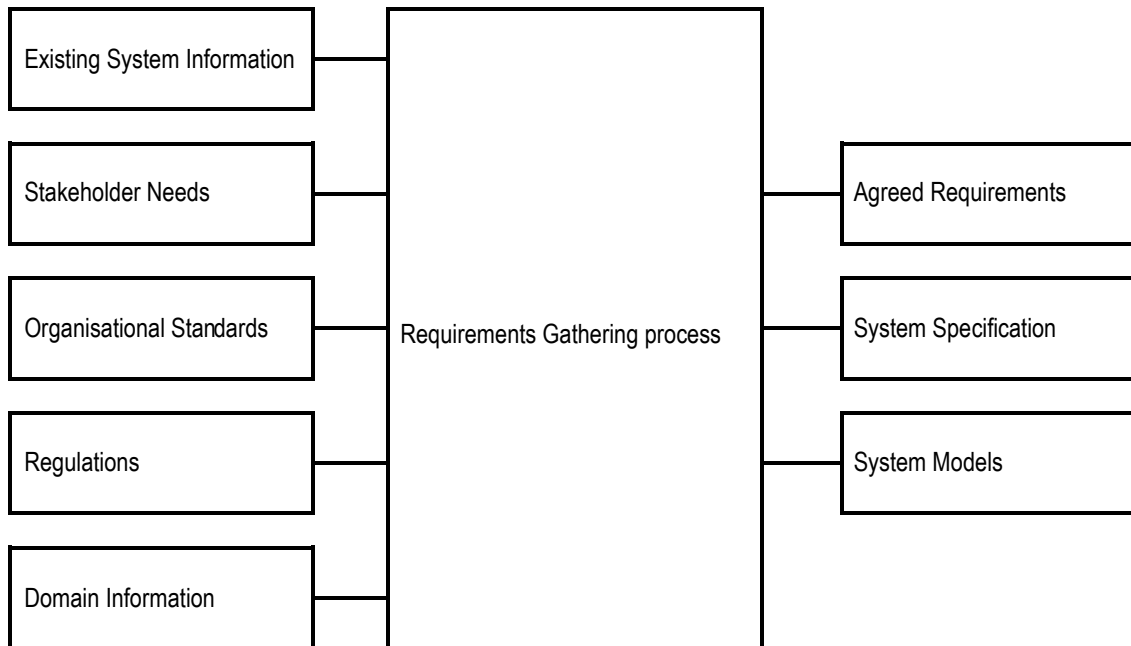
Definitions – acronyms, abbreviations etc.

7.15.2 Stakeholders

These are people who will be affected by the system and therefore should have a direct or indirect influence on the system requirements.

7.15.3 A Process Model

As a process model we might define the requirement process as follows.



7.15.4 Requirement General Questions

There are perhaps four general questions we might ask when attempting to gather requirements

Problem - What are the problems with the current processes?

Improvements - What are the improvement goals?

Reference. Kotonya, G. and Sommerville, I, (1997), Requirement Engineering, Wiley, ISBN 0-471-97208-8. This book is useful because it also contains excellent reading and reference lists.

7.16 Research Design

Finally, you must set out your research design. That is, explain how you will get your data – and this must be done in great detail. In summary, then, your research design is the blueprint of your research project which enables you to deal, systematically, with:

What questions to study?

What data is relevant?

What data to collect – you will need to work very hard here so that you can rely on your data.

Are there any practical limitations to what you can do

How to analyse the results – don't shirk this.

How to decide in which contexts your findings are applicable or can be exploited.

The main purpose of your research design is to help you avoid a situation in which the evidence you eventually collect does not address your initial question.

7.17 Research Process Development

It is quite common is many kinds of research but notably in Case Study and Action Research for the researcher's perceptions to change as data emerges. Often this will imply that the research design has to be changed or amended if it is to remain meaningful. These changes may be small such as a slight modification to the Research Question or aim but occasionally it may be necessary to make significant changes. For this reason researchers must always be careful in their design to allow a little flexibility if they can to accommodate possible unforeseen circumstances.

8. WORKBOOK 8 - BIBLIOGRAPHIC REFERENCING HARVARD APA

This workbook is a short summary of the APA style guidelines as contained in The Publication Manual of the American Psychological Association, 5e, 2001 (Subject Reference Collection: 808.02 AME).

The APA style is based on the Harvard referencing system whereby the date of publication follows the author name(s), and in-text references refer to items in the reference list using the author surname and date of publication, in brackets.

Referencing is important in all academic work as it indicates to the reader the sources of your quotations and borrowed ideas. Failure to indicate your sources is tantamount to plagiarism (literary theft). The purpose of the referencing system is to describe your sources in an accurate and consistent manner and to indicate within the text of your paper where particular sources were used.

Please note that there are two sections to this document:

How to **reference** correctly a source in the **bibliographic** section of your work

How to **cite** correctly a source in the **written** part of your work

Don't Get Caught Out! If you do not reference correctly you may lose marks or your work may be returned unmarked to you for correction. Therefore:

Keep a careful note of all sources used as you prepare your assignments.

Record all the details you need about a library book (including page numbers for any quotations) **before** you return it - someone else may have the book if you try to go back and check later.

Make sure you write down the source details you need on any photocopies or downloads you make.

Remember to print or save details of any website you want to refer to and record the date when you accessed the information.

8.1 Reference list (Bibliography) at end of Project/Dissertation

The reference list should be arranged alphabetically by author surname. The APA format requires book and journal titles etc. to be italicised, although we are not strict about that.

As a rule in projects and dissertations it is normal to produce two lists. The first is a reference list and that **MUST** only include sources you have cited. The second is a bibliographic list which includes all other sources you might have found but did not cite – this list is to allow the reader to explore the topic further if they wish.

8.2 Books

The details needed for a book can normally be found on the front and back of the title page. Make sure you locate the name of the publisher rather than the printer or typesetter. You need the name of the publisher in your reference list. Ignore any reprint dates; you need the date when the first, second, third edition etc. of the book was published according to which edition of the book you are using.

8.3 Journal articles

The details needed for a journal article can usually be found on the contents list, front cover or article itself.

8.4 Printed publications: Examples of References

The following are sample if how to correctly reference a source.

Book – pattern: Author, Initials. (year). Title of book. Place of publication: Publisher.

American Psychological Association. (1994). Publication manual of the American Psychological Association 4e. Washington, D.C.: Author.

Encyclopedia of psychology. (1976). London: Routledge.

Gardner, H. (1973). The arts and human development. New York: Wiley.

Moore, M. H., Estrich, S., McGillis, D., & Spelman, W. (1984). *Dangerous offenders: the elusive target of justice*. Cambridge: Harvard University Press.

Strunk, W., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

Note: Only list up to 6 authors. The 7th and subsequent authors are abbreviated to et al.

Edited book

Maher, B. A. (Ed.). (1964-1972). *Progress in experimental personality research* (6 vols.). New York: Academic Press

Article in edited book (Chapter) - The basic pattern for a reference to a chapter in an edited book (where the chapters have been written by several different people) is:

Author of chapter, Initials. (year). Title of chapter. In Initials. Name of Editor/s (Ed.) *Title of book* (pp.start and end page numbers of chapter). Place of publication: Publisher.

Vygotsky, L. S. (1991). Genesis of the higher mental functions. In P. Light, S. Sheldon, & M. Woodhead (Eds.), *Learning to think* (pp. 32-41). London: Routledge.

Encyclopedia entry - If the entry has no author, begin the reference with the entry title followed by the date of publication.

Lijphart, A. (1995). Electoral systems. In *The encyclopaedia of democracy* (Vol. 2, pp. 412-422). London: Routledge.

Government publication

Great Britain. Command Papers. (1991). *Health of the nation* (Cm 1523). London: HMSO.
Great Britain. Home Office. (1994). *Prisons policy for England and Wales*. London: HMSO.

Report

Birney, A. J., & Hall, M. M. (1981). *Early identification of children with written language difficulties* (Report No. 81-502). Washington DC: National Educational Association.

Conference paper in published proceedings

Borgman, C. L., Bower, J., & Krieger, D. (1989). From hands-on science to hands-on information retrieval. In J. Katzer, & G. B. Newby (Eds.), *Proceedings of the 52nd ASIS annual meeting: Vol. 26. Managing information and technology* (pp. 96-100). Medford, NJ: Learned Information.

Journal article - The basic pattern for a reference to a journal article is:

Author, Initials. (year) Title of article. *Title of journal*, Volume number - if there is one (Issue number), start and end page numbers of article.

Noguchi, T., Kitawaki, J., Tamura, T., Kim, T., Kanno, H., Yamamoto, T., et al. H. (1993). Relationship between aromatase activity and steroid receptor levels in ovarian tumors from postmenopausal women. *Journal of Steroid Biochemistry and Molecular Biology*, 44(4-6), 657-660.

Popper, S. E., & McCloskey, K. (1993). Individual differences and subgroups within populations: the shopping bag approach. *Aviation Space and Environmental Medicine*, 64(1), 74-77.

Weekly magazine article

Barrett, L. (2001, August 23). Daewoo's drive to survive in the UK. *Marketing Week*, 22-23.

Newspaper article

Caffeine linked to mental illness. (1991, July 13). *New York Times*, pp. B13, B15.
Young, H. (1996, July 25). Battle of snakes and ladders. *The Guardian*, p. 15.

Two or more works by the same author(s) with the same publication date - Where an author (or particular group of authors) has more than one work in a particular year, list them in title order and follow the date with a lower case letter a, b, c, ... For example:

Harding, S. (1986a). The instability of the analytical categories of feminist theory. *Signs*, 11(4), 645-64.
Harding, S. (1986b). *The science question in feminism*. Ithaca: Cornell University Press.

Anonymous works - If a work is signed "Anonymous", your reference must begin with the word Anonymous, followed by date etc. as normal. If no author is shown, put the title in the normal author position.

Note on source page numbers - Use pp. for page range only for encyclopedia entries, multi-page newspaper articles and chapters or articles in edited books. For articles in journals or magazines use the numbers alone.

Interviews and email messages - Because interviews and email messages are not considered recoverable data, you do not give details in your reference list. You should, however, cite an interview or email message within the body of your text as a personal communication: ...and this point was conceded (J. Bloggs, personal communication, August 22, 2001)

Legal References - Because the situation regarding legal references is complex and only US law is covered in the APA Manual, legal references will be covered in a separate guide.

Audiovisual sources: examples of references - Such sources are often complex but please note.

Films - The basic pattern for a reference to a film is:

Name of primary contributor - the director or producer, or both, Initials. (Role of primary contributor). (year). *Title of film* [Motion picture]. Country of origin - where the film was primarily made and released: Name of studio.

Reed, C. (Director). (1949). *The Third Man* [Motion picture]. United Kingdom: British Lion/London Films.

Spielberg, S. (Director). (1993). *Jurassic Park* [Motion picture]. United States: Universal Pictures/Amblin Entertainment.

If the film doesn't appear on the Library Catalogue, the Internet Movie Database <http://uk.imdb.com/> is a good place to check all the details needed for a film reference (follow the Company credits link to find details about the film studio/s involved). Alternatively, check Halliwell's Film and Video Guide.

Review of a film - If the review is untitled, put everything in square brackets in the normal title position and keep the square brackets.

Kinder, M. (2002). Moulin Rouge [Review of the motion picture *Moulin Rouge*]. *Film Quarterly*, 55(3), 52-59.

Malausa, V. (2001). Beauté du mensonge [Review of the motion picture *The Tailor of Panama*]. *Cahiers du Cinéma*, 558, 82-83.

Television programmes

Collinson-Jones, C. (Producer), & Dobson, E. (Director). (2003, July 14). Casualties of peace [Television broadcast]. London: Channel 4.

Single episode from a television series

This example shows the most complete information possible for a television episode. If details of the writer are unavailable, begin your reference with the name of the director.

Fraser, R. (Writer), & Geoghegan, S. (Director). (2003). Eyes wide open [Television series episode]. In P. Goodman (Producer), *Holby City*. London: BBC1.

Radio programmes

Portenier, G. (Producer). (2003, July 17). *Crossing continents*. London: BBC Radio 4.

Electronic sources: examples of references - The details shown below have been compiled according to the guidelines available on the APA Website (<http://www.apastyle.org>) in August/September 2001 (re-checked July 2003). Check this Website and the 5th edition of *The Publication Manual of the American Psychological Association* which is available in the Frewen Library for further guidance.

The basic pattern for a reference to an electronic source is:

Author, Initials. (year). *Title*. Retrieved month, day, year, from Internet address.
Banks, I. (n.d.). *The NHS Direct healthcare guide*. Retrieved August 29, 2001, from <http://www.healthcareguide.nhsdirect.nhs.uk/>

If no date is shown on the document, use n.d.

If the author is not given, begin your reference with the title of the document.

If a document is part of a large site such as that for a university or government department, give the name of the parent organisation and the relevant department before the Web address:

Alexander, J., & Tate, M. A. (2001). *Evaluating web resources*. Retrieved August 21, 2001, from Widener University, Wolfgram Memorial Library Web site: <http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm>

Deciding your future. (2000). Retrieved September 5, 2001, from University of Portsmouth, Careers Service Web site: <http://www.port.ac.uk/departments/careers/plancareer/deciding-your-future.htm>

Electronic journal articles which are duplicates of the printed version - Use the same reference format as for a printed journal article but add "Electronic version" in square brackets after the article title:

Lussier, R. N., & Pfeifer, S. (2001). A crossnational prediction model for business success [Electronic version]. *Journal of Common Market Studies*, 39(3), 228-239.

If you are referencing an online article where the format differs from the printed version or which includes additional data or commentaries, you should add the date you retrieved the document and the Web address (URL).

Articles in Internet-only journals

Korda, L. (2001, July). The making of a translator. *Translation Journal*, 5(3). Retrieved August 21, 2001 from <http://accurapid.com/journal/17prof.htm>

Use the complete publication date shown on the article.

Note that page numbers are not given.

Whenever possible, the URL you give should link directly to the article itself.

Break a URL that goes onto another line after a slash or before a full-stop. Do not insert a hyphen at the break.

Articles retrieved from a database - Use the format appropriate to the type of work retrieved and add a retrieval date, plus the name of the database:

McVeigh, T. (2000, July 9). How your gestures can do the talking. *The Observer*, p.7. Retrieved September 10, 2001, from The Guardian and The Observer on CD-ROM database.

8.5 Citing references in the text

There are basically two forms. The first is when the author's name is naturally part of the sentence and the second when it is just a reference. References are made from the text of the paper to the full details of the work in the reference list in the following manner:

It is a contention of the paper, and this contention is supported by Williams (1995, p.45) who compared personality disorders ...

When an author, or group of authors, has more than one publication in the same year a lower case letter is added to the date. For example:

In two recent works Harding (1986a, p.80; 1986b, p.138) has suggested that ...

With two authors both names should be listed in each citation e.g. Duncan & Goddard, (2003, p.99)

With three to five authors name all authors the first time, then use et al. (and others). For example: the first time it would be Moore, Estrich, McGillis & Spelman (1984, p.33) and subsequent references to the same publication would use Moore et al.

For six or more authors, use et al. after the first author in all occurrences.

Note that when the in-text reference occurs naturally within the sentence "and" should be used before the final author.

When a source has no author, cite the first two or three words of the title followed by the year. For example:

... in the recent book (*Encyclopaedia of psychology*, 1991, p.62) ...

... in this article ("Individual differences," 1993, p.12) ...

Web pages where no author is given

However, if the author is designated as "Anonymous", cite the word Anonymous in your text e.g. (Anonymous, 1993, p.116).

When using quotations in your text

Try to observe the following methods.

Gardner (1973, p41) stated that, "The relative importance of the systems may nevertheless remain in approximately the same proportion"

Smith (1991, p84) found that "...there is no evidence that chimpanzees can produce a drawing and discern the object represented in it..."

Occasionally, very occasionally you may need to cite a work that you discovered in another work because you cannot find the source then observe the following examples:

Smith (1970, p.27) cites Brown (1967) as finding ...

Brown (1967), cited by Smith (1970, p.27), found ...

It was found (Brown, 1967, cited by Smith, 1970, p.27) that ...

If you need to use this form your tutors must approve it and you must show that you have made every effort to track down the primary source.

9. WORKBOOK 9 – WRITING UP A RESEARCH PROJECT

This document is in several sections covering everything from project supervision to grading.

9.1 Your and Your Supervisor

The student supervisor relationship is very important if a high quality project is to be the outcome. As a rule the supervisor will be interested in the topic area and will want to be active in its development although you as a student must do the work. However, your supervisor will not be expert in everything but will usually have some knowledge of simple statistics and the four main research methods: experiments, action research, surveys, case studies and application development.

9.1.1 Student Expectations

The normal expectation is that students have of their supervisor are as follows:

- Only be available for consultation for a limited time.
- Only supervise what the student does and not do the work for them.
- Advise on research design, scheduling and literature surveys.
- Advise on theoretical, conceptual and methodological issues.
- Advise on development of research skills.
- Advise on data collection, processing and analysis.
- Advise on ethical issues if they are relevant.
- Read, evaluate and be constructively critical of student work if given sufficient time.
- Have a good knowledge of the general area you are working in.
- Be in contact with the student regularly.
- Arrange if necessary supervision chat sessions.

For project students on distance learning programmes it will be possible to have meetings in the WebCT chat room, using IM or Skype where a full and detailed interaction can take place. These must be agreed with your supervisor and must be planned not to clash with other classes. However, some tutor may allow student to contact them any time they are seen to be online.

9.1.2 Departmental Expectations

Supervisors take a formal role and certain attitudes and actions are expected. In general they will:

- Visit the discussion board and email regularly within WebCT (at least 3 times per week).
- Set a mail forwarding address to their personal accounts in WebCT email settings.
- Devote at least 6 hours to the supervision process spread over the project duration.
- Conduct one-to-one chats as required with project students.
- Conduct student/supervisor communication within WebCT or their personal email account.
- Respond to a student query within a certain time frame (normally no longer than 3 days).
- Be familiar with all the project guidance notes and workbooks.
- Be familiar with the project chapter profiles.
- Make sure students know if they are to be away for an extended period.
- Be aware that students may make contact through any one of their three WebCT accounts.

The essence of online supervision adequacy is based on the quality of communication between supervisor and student with the intent that we want the learning experiences to be exiting, stimulating and self-rewarding. In practice this means that communication must be frequent, lucid, critical and yet encouraging.

Supervisors should be aware that if they set email forwarding in WebCT they will effectively get an automatic alert when there is mail for them. If the student has also set mail forwarding then supervisors will be able to reply immediately otherwise they will have to go into WebCT. However, there is no alerting mechanism if a student posts a question into discussion so supervisors must visit the site from time to time so as not to miss any messages.

9.1.3 Supervisor Work Reviews

Supervisors will read your written work. However, when they do this certain rules apply:

Finished work – you should supply your supervisor with written work as it is produced chapter by chapter but it must be finished work. In this context finished work means that the format and content are the very best you can produce and in accordance to the guidelines found in this workbook. The tutor's role is not to act as some kind of filter for rough work or polishing multiple drafts which you want to improve in effect making them do the work for you. If a tutor suspects that the section you have sent in is not in its final form they will return it to you without comment.

Action on Feedback – if you are given feedback on any part of your work then you are expected to study it with care and commitment. However, it is up to you how to respond or even ignore what you are told but in all cases the consequences that follow are entirely your own responsibility.

Responding to Feedback – in all cases you are expected to respond to feedback. This may take several forms: writing to your supervisor saying that you don't agree with him or perhaps offering further explanation or as in most cases making changes to the content or structure of your project document. When you make document changes in response to feedback they are to be shown **shaded** so your supervisor can easily see exactly what you have added or amended.

Questions to Tutor - your tutor will not answer any questions regarding whether your work is right, wrong, is it a pass, what mark will I get or is it good enough. The only thing you can expect in this area is that you tutor may advise you that the work is not ready for submission to the university. If this happens it will be entirely your own decision whether to submit or not.

Response from Tutor - in most cases you supervisor will only suggest that you do something or ask a question designed to point you in a new direction. Normally, the tutor will not supply you with any project content since that must be provided entirely by you. The reason is that the work is yours not the supervisors.

Preparation - Your supervisor will expect you to be familiar with all the notes and workbooks contents. You should therefore be careful that you don't waste supervision time asking questions to which you already have the answers.

9.1.4 Chat Session

Chat sessions for project students will usually be one-to-one and are typically used when there are particularly awkward difficulties – chat will NOT be the norm during projects and your tutor will have no expectation that chat will be used.

9.2 Overview of Project Structure

Here are some general guidance notes – they are NOT suggested chapters but general content guidance on the project as a whole and have a sharp process focus.

9.2.1 Introduction summary

This is about the problem theme and its setting, client context, topic area, personal theory, Research Question or application functional description and intended project outcome, general research orientation followed by a well-define aim and sound set of objectives. The introduction is to be precise, concise taking a discussion form that is explanatory and focused on giving readers a clear, coherent and comprehensive view of what the project is about.

9.2.2 Preparation for Research

This is your study of the topic area and research methods that you will need to know about. You will have to justify and explain the methods you intend to use; it is also your study of other people's work in the area that you wish to investigate - and a description of how you learned from their research.

Literature Review - What has been done before in this area - related to a particular problem theme and Research Question. This is all about preparing ones mind with all the topic area and research knowledge you will need.

Research Review - research into how the project investigation could be done and supported. At this stage student will already have an outline plan based on their approve specification but now the whole design must be thoroughly reviewed before actual work begins.

Knowledge of Alternatives – build a simple decision base which allows one to consider which methods could be used and how could they be used for this project.

Choices Made - which methods are to be used and rationally consider why they are good enough for the purpose.

9.2.3 Core Research

Here you execute the refined research design translated into a practical plan to obtain the collection of primary data and process it using acceptable methods into the intended project outcome.

9.2.4 Evaluation and Conclusions

This is the stage that looks at how one finishes off a project by a process of evaluation and the drawing of conclusions. In particular, it is needful to look at how one evaluates what was done and how it was done – that one needs to consider the project product (or outcome) and the project practice. For our purposes evaluating will be taken to mean reflecting on product and practice.

Many students confuse evaluation and conclusions but for a full consideration of the research work one must look at all project specific results and outcomes as well as practices and evaluate them and then perform the more difficult step of drawing generalised conclusion about both product and practice.

Evaluation of Project Product – the project outcome or product is normally evaluated against objectives, other existing products, using defined criteria or some form of expert evaluation. Additionally, one needs to be aware of any constraints that might have an impact on the applicability of the outcome

Evaluation of Project Practice - evaluation of project practice is more difficult than evaluation of project product and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way'. Additionally, one needs to be aware of any constraints involved, including time management that might have impacted on the use of best possible practices.

Conclusions - need to be considered thoughtfully as this is the point where one looks for implications and meaning that arise out of an attempt to generalise the findings.

9.3 Writing up your Project

The following sections describe elements that occur in almost all projects and which are generally important in constructing scholarly work. Do not be tempted to ignore these instructions – anyone who departs from the spirit of them may have their work returned for correction prior to formal marking.

9.3.1 Main Project Body Page Layout

The following example shows how each page of a project report should look, note that each chapter should start on a new page and that it is NOT necessary to actually say Chapter 1, Chapter 2 and so on as it is the heading that is important. Do not use numbering to greater than to three levels but you may use indented (but not bulleted ones) entries within a section at any level.

1. QUALITY CONTROL IN PROGRAM DEVELOPMENT

In this chapter the nature of quality will be discussed and its relation to physical measurable properties that might characterise quality.

1.1 INTRODUCTION

This project discusses a possible strategy for devising a program development methodology that goes some way to guaranteeing the qualities of the delivered system. In particular it will concentrate on just two aspects - that of developing generic designs and code and how such designs could be assessed for quality and function. The strategy is based on the simple premise as endorsed by leading authors in the field such as Blenkinsop, Wilson and Bowers that categories of problem can be identified and formalised. It is the contention of this report that such a process would more or less automatically:

Reduce - the complexity of the design process itself.

Ensure - the quality of the final product by:

Giving managers more control over the product development cycle.

Giving users more idea of the kind of system they are likely to get and much more say in what the shape of the product will finally be.

Releasing programmers from the drudgery of having to design the same piece of code over and over again, thus enabling them to concentrate their efforts on new

Formatting Note – you are encouraged to use these two forms of indenting: one with a heading in bold and one without as a means of structuring and indented section. The use of bulleted indents is not recommended anywhere in a project document.

1.2. Multiplicity of Design Factors

Every programmer has had the difficult experience of having to read and understand programs written by someone other than himself or herself. The sort of problem encountered may be aptly expressed in the following lines.

Everything has been thought of before, but the problem is to think of it again. (Goethe)

Many other authors, notably Frewin (1989) have discussed the notion of 'quality model ratios' and in essence this idea means that software systems have an implied model which can be accessed for

1.2.1 Multi-Tier Systems

In modern client sever systems

1.2.2 Interface Facades

In this case we look closely at the Internetetc

9.3.2 Plagiarism Checking

A software tool will check all your sources automatically and if plagiarism is suggested it will be dealt with very seriously since the reputation of the whole course and of the University is at stake. You must remember, that copying, paraphrasing, summarising and similar techniques where the material is extracted from a source must be properly acknowledged.

A simple rule is that if you use more than 6 consecutive words from a source it must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

9.3.3 Writing Abstracts and Identifying Keywords

The function of an abstract is to summarise your project, its context and its conclusions in order to give the reader an overview of the main project theme so that they can make an informed decision on whether they want to read the entire report. A good basic structure might be defined as follows but it will usually be limited to around 300 words.

What was the project about?

What did you actually do?

What were the conclusions?

It is normal to add keywords or phrases after the abstract to act as specific pointers to content. There are no particular rules about how to construct these words or indeed how many there should be but typically there are 5 or 6 and to be useful they must be chosen with care in the sense that they might in themselves be regarded as a sort of abstract of ones work.

9.3.4 Standard Appendices

Project reports MUST include the following appendices:

Your Project specification – it may be brought up to date from that submitted at the start

Your project plan expressed in an appropriate format

A glossary if this is appropriate

A full reference list of work that you cited

A bibliography (may be combined with your citation list)

Each Appendix should be introduced by a title where the number (12 in this case) should follow on from the numbering within the body of the report: **12. Appendix A – Project Specification.**

9.3.5 Typical Project Organisation

Below is a suggested organisation for your complete project.

Briefing Pages

Heading pages (examples follow later in the section)

Plagiarism declaration

Abstract for Report including keywords

Acknowledgements

Dedications

Content list (automatically generated) for all headings, tables and figures/graphs etc

Introduction:

Brief topic area outline and background to problem
Presenting Problem definition
Real World Target relevant to the problem
Speculation of problem causes and possible solution routes
Personal Theory on the best solution route
Research Question/Application Description
Discussion of expected project outcome
Scope of work
Aim & Objectives

Literature Research (see Workbook 5 for recommendation for various project styles)
Detailed consideration of elements that help you focus on your topic area

Research Design

Research Method and its rationale in dealing with the research question/application
Process to collect Primary Data
Processing of the Primary Data to get an outcome

Application Testing (Engineering project only)

Design of Tests
Test Results and conclusions to be drawn from testing.
Implementation plans

Results Discussion and Presentation (study projects only)

Discussion and presentation of results
Generation of intended project outcome

Evaluation (these are specific to what you did)

Detailed evaluation of what was actually done – your practice
Detailed evaluation of your project product/outcome including objectives not met
Met/Not met objectives

Conclusions (here one tries to generalise what was done)

Generalisations based on a consideration of both product and practice
It is also possible to examine the following minor conclusion elements

- Usefulness of literature sources
- Future work/development
- Relevant aspect of the course used during the project period
- Changes one would make if project were repeated
- What you have learned
- Value-added features

References and bibliography (see workbook 5)**Content of Appendices**

The following items must be in a set of Appendices. These may be bound separately if the composite document becomes too large (more than 100 pages).

- Code listings
- Project Specification and project schedule
- Inclusions (copies of relevant documents such as policies, invoice layouts, diagrams etc)
- Questionnaires.
- Summary interview transcripts
- Details test plans
- Requirement catalogues
- Glossary
- Other

9.3.6 Project Types Sample Outline Contents

Broadly speaking there are two kinds of project: engineering where you build an application of some kind and study based where one would investigate in depth some idea. Here are some sample contents lists that show chapter or section headings for the different project styles. However, if it is obvious that these samples have just been copied into your project with minor changes then your work will be rejected. See Workbook 9 section 9.3.5 for further general details.

Sample Study Style Report Contents	Sample Engineering Report Contents
Title: Internet Marketing – A Users View	Title: BrokerBase – Insurance Sellers Information System
Chapter 1. Introduction to Internet Marketing	Chapter 1. Introduction to System
Introduction and contextualisation IT marketing problem theme Problem Theme and target Speculation and Personal Theory Discussion and Exploration of Research Question Project aim and objectives	Introduction and Situation Overview Situation based Presenting Problem Application background and context Application overview Project aim and objectives
Chapter 2. Literature Review	Chapter 2. Literature Review and Application Scenario
Introduction to Internet Marketing Marketing Planning eCommerce Technologies and Tools Costs and Benefit Estimation Consumer Orientation and Market led operations IT supported Marketing and selling techniques Product, Price, Place, Promotion and Customer expectation IT supported Experiential marketing Security protocols and languages Auditing and secure payment systems	Outline of Insurance Brokerage practice Background Review of the Application Scenario Outline of Application Build Process and Tools
Chapter 3. Research Design	Chapter 3. Requirements Specification
Research Method Selection and Rationale Primary data collection process Data specification Data locations and expectations Collection Protocol Processing of Primary Data Collection Outline Results Project Outcome	Outline of the requirements (requirement catalogue into appendix) Research Plan for requirement gathering: functional, performance, technical and usability Outline Requirements catalogue Analysis and Evaluation of requirements
Chapter 4. Evaluation (Project Specific)	Chapter 4. System or Application Design
Evaluation of Project Outcome Evaluation of Research Methods and Protocols used	Principles used for this design Overall system design Build Process Overview Database design Component design Interface design including website
Chapter 5. Conclusions (Project Generalisations)	Chapter 5. System Implementation and Testing
Generalisations on the research Outcome Reflections on what was learned etc	Testing strategy Testing plans (detailed plan placed in appendices) Test results (detailed report placed in appendices) Application Implementation plans
	Chapter 6. Evaluation
	Evaluation of the application Evaluation of practice (methods and tools used)
	Chapter 7. Conclusions
	Generalisations based on the Application Reflections on what was learned Future work Etc
Notes	
1. Whatever the project styles the appendix must include: the project specification, glossaries, references lists, bibliographies. The appendices may be attached to the main report or they may be placed in a separate document.	
2. Remember these are just samples and you may well have different numbers of chapters and different heading and sub-headings	
Table 6. Sample Project Content Outlines	

9.4 Report Writing

In your research you will often have to write reports and of course you will have your final report to write. Reports are a special form of writing and therefore you need to note that reports are:

- Written for defined purpose.
- Written and targeted at specific audience.
- Written systematically to present your findings.
- Focused on what you have done.
- Information structured and formatted to lead reader quickly to main themes and findings

9.4.1 Structural Elements

The following tables are intended to give you some guidance on how to construct report in a scholarly fashion and in a way that leads to clear and concise presentation. It is important to structure all your work in a way that enhances its usefulness and utility. The following is a list of all the major structural elements, though there is no need to use all of them in every document you produce. The best advice is to choose a structure and then those elements that best suit the work in hand.

Structure	Description	Location
Title	A focused and short description of the document that summarises the deliverable element	Front page and above the contents list
Contents List	A short index based on the major chapters and/or sections	Before the main document begins but after the title page
Glossary	Used to list and describe special terms or abbreviations	Towards the end of the main document
Index	A detailed listing of all important words or phrases specifying location in main text	After the glossary if it exists otherwise after the main document
Appendix	For inclusion of explanatory notes, special documents or copies of originals	After the glossary but before the index
Footnotes	Notes at the bottom of pages and linked to pieces of text.	Immediately before the page footers
Headers	Standard text	Every page
Footers	Standard text	Every page
Keywords	Words or phrases used to form a simple classification of your work	Near front of report
References	List of all reference material in an approved manner	Toward end of document

Table 7. Main Document Physical Structural Entities

Organisation	Description
Chapters	Major elements in the development of the subject matter of the document
Sections	Minor elements in development of each chapter
Headings	Major Information Content indicators
Indents	Used to emphasise small but important points in the text
Bullets	Used to further emphasise an indented text
Tables	Used to represent important information concisely
Paragraph numbers	Used when it is necessary to reference all parts of a text
Page numbers	Used for indexing purposes
Diagrams	Used to show idea or data pictorially
Captions/Legends	Added to diagrams where necessary
Columns	Use when the subject material lends itself to such a view

Table 8. Main Document Structural Devices

Presentation	Description	Examples
Font	Letter style and size	May be proportional or fixed point
Renditions	Printed form of font	Bold, underline, italic, reversed
Orientation	Page format	Portrait or landscape
Form	Delivery form	Paper, electronic
Table 9. Main Document Structural Properties		

9.4.2 Report Writing Stages

There are a number of stages to writing a report and they require you to be focused on what you are trying to show as the core of your report.

What are your trying to show – this really goes along with the underlying purpose of your research question – typically this will be about wanting: to inform, to explain, to evaluate, to prove, to advise, to recommend, to predict or to bring about changes.

Collect and sift material – it is important to jot down ideas relevant to your purpose. These jottings will help you form an action plan for gathering information from other documents, visits, interviews, observation, surveys etc.

Note - information sources as you find them

Organise and structure the material - group your work into chapters, sections and sub sections. Make sure the order is logical.

Draft and edit/redraft – to get a good report you may well have to re-write it several times and this may include complete re-ordering. It is important that you need to be concise and use a formal language but it must be clear and concise. Use simple, straightforward words and sentence construction and make sure your spelling and grammar are faultless. Use clear headings and sub headings with bulleted indentations.

Thematic – make sure your work has clear themes that are easy to follow.

Plain English - do not try to be over-clever or fall into jargon.

Read Saunders chapter 13 pages 414 to 443. Don't skimp on this or I might skimp when I mark inferior work!

9.5 Summary and Advice

Your final project must have a strategic dimension. This does not mean you can't build some software but if you do it will be in support of a strategic objective. So whatever you decide to do consider:

Why it is being done but note it will not be sufficient to just say why, you will have to show evidence for your conclusion.

Cost/benefit is a useful idea but in most cases it is very hard to show benefits. In any case you need to look at other possible ways of showing that something is worth doing.

Don't forget life cycle logistics - that is what are the costs per hour (for example) of running a system for say a 10-year life.

Also look for impact for what you do. For example something might be cost effective but may have a negative affect on some business element.

Think through your ideas; don't be narrow - question everything.

Traditionally strategies are developed around two themes: needs - what are the business needs (at a high level) and what are the business values (what does it regard as important)

9.6 Project Submission Regulations

Successful project reports may lodged in the University library, it is therefore important that reports follow a standard binding format as described below. Project reports that deviate from these regulations may be penalised and returned to you for correction and in extreme cases, failed.

Submission - two full bound A4 portrait orientation copies of your report must be submitted by the defined dates. The report may NOT be submitted electronically – the copies must be sent by courier to reach us by the defined dates. However, you must also submit soft copies on either floppy disc or CD/DVD.

Presentation and Submission Checklist – your project report submitted using the correct form shown in Workbook 10. The form must be bound into your project.

Report Length - the maximum permitted report length is 15,000 words, which usually translates into around 50 to 100 pages (excluding appendices). If your report is likely to be significantly longer than this, consult your supervisor as to what to include and what to exclude. You are warned that should you exceed the permitted maximum length the University may return your work unmarked.

Binding - the project and any separate appendices should be securely bound using tape or book binding - if that is not available then plastic ring binding may be used. No other form of binding is permitted. Binding covers should be a card of weight of 140 gsm and the normal colour is to be RED but any other colour may used in case of sourcing difficulties

Front Covers Format - the front cover appropriately spaced vertically should conform to the pattern shown below using 24-point Arial Narrow with centred text and bold as shown. Do not include the square brackets when you complete these formats as they are just placeholders

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [Name of supervisor]

Project unit Code [Project unit code]
[Month and Year, e.g. September 2004]

Title Page - the first project contents page, appropriately space vertically must contain the following information in the order shown below using 12 point Arial Narrow/Time Roman type throughout. Do not include the square brackets when you complete these formats as they are just placeholders.

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [*Name of supervisor*]

Project unit: [*Project unit code*]

[Month and Year, e.g. September 2001]

Abstract - [The abstract of the project should be between 150 and 300 words in length and constructed to say what the project was about, what you did and what were the conclusions]

Keyword List - [List of appropriate key words]

Acknowledgements Page - it is common practice to add a page listing those you wish to thank for their help and assistance. As a rule acknowledgements should **only** be given to people who helped you directly with your work but were not involved in it. For example, if a colleague supplied you with a statistical analysis they should be acknowledged. However, it is not usual, necessary or desirable to acknowledge your parents, your friends or your supervisor.

Submission Form and Plagiarism Declaration

You must add the following two pages which require a signature. In practice one adds the signature to the final bound copies.

Declaration of presentation Standards

Include at this point a completed copy of the project submission page shown in workbook 10. Be warned, that if you tick this page and the relevant element is not found to be present, the work will be returned to you unmarked for correction.

Plagiarism Declaration

I confirm that the enclosed written work (including application code) is entirely my own except where explicitly stated otherwise. I declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

Signed _____ Date _____

Contents list, Table List and Diagram List

Include as appropriate

9.7 General Grade Criteria

Workbook 14 gives general guidance as to how projects will be assessed. Workbook 14 also contains a table of the criteria used, although the emphasis given to various aspects may vary depending upon the nature of the work and should be explained to students in assessment specific criteria.

9.8 Project Examination Board Reflections

This is a discussion based on observations made on the marking forms and in the Examination Board regarding the quality of the submitted document as final Master's projects/dissertations. Most of these faults are due to shallow and sometimes very shallow thinking on the part of the project student and that is unacceptable at Master's level. The following points are to help both supervisors and students avoid known pitfalls and so produce a project document to a high standard.

9.8.1 Project Introduction – Study Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem definition – common deficiencies were no discussion or poor discussion of what problem was being addressed by the project. Without such a discussion it is almost impossible for a reader to get any grasp of what the project is about. In projects we want to see just ONE major problem theme not several so it often requires clear thinking to set it at the right level. (See workbook 6 section 6.2 and 6.5)

Target and Outcome – there is often considerable confusion over these two ideas. The target is about what might happen in the real world based on the project outcome but often students cannot distinguish what the project will generate and what might be done with that project outcome. As a simple example, students might say that the project outcome is "improved accuracy in data entry" when what they mean one supposes is that in their project they will design (say) a new training programme that will be used to get the real work target of improved accuracy.

Speculation and Personal Theory – students are encouraged to speculate about problem causes and solution routes to arrive at a personal theory about the problem theme and how it might best be resolved leading to a suggestion of an expected form project outcome. A reader expects to see some indication as to what form the project outcome will take and in addition some discussion of the form to at least show that it is likely to go some way to resolving the stated problem theme. Unfortunately, the form was often missing and even when the Research Design was consulted a typical reader could still not see what the project outcome was supposed to be. Here we want to see ONE major form outcome for each project. (See workbook 6 section 6.5).

Research Question - either missing, badly worded or multiple questions offered (sometimes all in one sentence). One common mistake was to ask a question in the form (or some equivalent) of "is it possible...." - the point is that in such questions the answer is almost always that it is possible so the research effort becomes pointless. (See workbook 6 section 6.7 and 6.9)

Process for Generating Primary Data - this is a key element in any project as it is essentially the main activity used to unlock the primary data. It is useful to discuss this process briefly in the introduction since that allows readers to link the problem theme and therefore see what data you are likely to be looking for.

9.8.2 Project Introduction – Engineering Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem Theme - there was either no discussion or poor discussion of what problem theme the application being built was supposed to resolve. When this happens it is almost impossible for a reader to get any grasp of what the project is really about. (See workbook 6 section 6.2 and 6.5)

Functional Description - many students could not provide a short functional description of the application they were going to build. The most common thing for students to do instead was to provide an overview of the application architecture. This is hopeless as architecturally almost all Engineering projects are the same in that they typically have a database and a webpage for example. This implies that students cannot or do not want to make a distinction between how an application is built and what its purpose is.

9.8.3 Aim and Objectives

In many cases these elements were missing altogether. In other cases one could barely link the aim to the Research Question or application description. However, of most concern was an apparent inability in many students to write a coherent and reasonable set of objectives. Not to be able to write an aim and more particularly objective is representative of a gross error and it should never occur in Master's level work.

Aim - usually composed in a reasonable way but there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just one clear outcome for the aim. (See workbook 6 section 6.11, 6.11.1)

Number of Objectives - often there were far too many to be in any way practical for one student in the time available and often this was because they were all expressed at different levels of project resolution.

No Visible Outcome - there were many, many cases where the objectives had no visible outcome. Far too often we got phrases such as: "To understand...." or "To analyse...." without any object to the sentence so there was no outcome that was visible. Without a named outcome there is no way that the objectives can be seen to have been completed. (See workbook 6 section 6.11)

Not Project Bounded - there were many students who cited operational objectives as outcomes. For example it was common to see lines such as such things as "To improve the workflow in the invoicing section". Here is a case where such an outcome cannot be written into a document or be in practical terms viewed and so cannot be used in a project. Typically, unbounded objectives refer to something that might happen based on the project outcome after the actual project has been completed (See workbook 6 section 6.11)

Objectives as Requirements - very commonly but still rather worryingly, many students, on Engineering projects, seem to think that objectives are the same as application requirements. (See workbook 6 section 6.11)

Objectives as Benefits - less commonly but still rather worryingly, many students, on Engineering and study projects, seem to think that objectives are the same as benefits. For example, in a study project on CRM systems what one often finds in place of project objectives is a list of benefits of implementing CRM. Similarly, for Engineering projects we see objectives written as a set of benefits of using the application being built later on in the real world. (See workbook 6 section 6.11)

9.8.4 Literature Review

In research the literature review is regarded as being essentially preparation of the mind. It follows, that to be serious about this step one has to be evaluatory and reflective as you read and write. Ideally one needs a strong theme which is used to weave an expository and exploratory discourse that unites and builds one's understanding and ideas with what has been written by other authors on one's core topic area.

For projects a full literature review is only needed in the case of a study project. For Engineering all that is required is a thorough overview of the application area. So for example, if an application were about Insurance brokerage then all that is required is a description of what brokerage is but only to the level necessary to understand the requirements. With this aim in mind: (See workbook 5 but section 5.2 and 5.6 should be studied with care)

Structure - many reviews were poorly structured and one often felt that the students had just written down the material as it occurred to them without any thought as to a wider readership.

Theme - often there was no detectable theme connecting the various sections of the review narrative and a reader would therefore be forced to guess and see how all the various elements were connected.

Value Added - the most common flaw was to see a review that was entirely or almost entirely made up of quotations, paraphrases or summaries so that the 'hand' of the student was not detectable anywhere in the work. Such work is not evaluatory and gives no indication whatever that the student has learned anything of value or indeed anything at all. It is often the case that one feels the student has no notion of the literature being a driver that may mean they have to accept new knowledge, gain further experience, modify existing knowledge or even abandon what they thought was sacrosanct and sadly no belief that their own views and experiences are also important.

Citation Style - two things are evident here. Firstly, one finds that too often citations are limited to the Literature Review. Secondly, the actual style used is very poor and commonly we see the form (Burk, 1992 p45) placed at the end of a sentence or paragraph. This is not acceptable and can only mean the whole paragraph has been paraphrased. The ONLY correct use of this bracketed style is in a passing reference to a text. (See workbook 8)

Worthless Quotes/Paraphrases - it is unfortunately only too common to see an appeal to some text or other for information that tells you either common knowledge or makes an obvious observation and so the citation is worthless and is representative of weak scholarship and laziness where a student is just trying to add a citation because he knows that such things are desirable. For example, quoting an author who says that "Object Orientation is now routinely used in software construction" is representative of common knowledge or quoting an authors who "says change is inevitable in organisations" is something that one might regard as obvious.

9.8.5 Research Design

These were often far from satisfactory and often read like a joke delivered without the punch line. The students are taught that essentially there are two phases. The first phase is the process used to get primary data items that are formed into a collection. Once the collection phase is completed we move on to the second phase of processing where the collection of primary data is processed to get an answer in the form expected. Particular points are:

Research Phases - In many case students were unable to distinguish the processing needed to get a collection of primary data and processing of the collection of primary data to get an outcome. It is quite common to see these two phases ignored or become competed muddled leading to a poor research outcome because the student loses his/her focus and often appear to have no clear idea what they are doing. The phases are:

Phase 1 - a process or processes used to define and create a primary data collection. It typically has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the data and present the data.

Phase 2 - a process or processes used to manipulate the collection of primary data to get the form of answer expected.

No Outcome - often it seemed as if the student had no idea what form of outcome to expect so when one looked at the processing there was no sense that the primary data was being transformed into the required form of outcome.

Primary Data - many students seem to have only a vague notion of what primary data is and will often, very often, confuse or think that primary data is the same as the method of collection. This confusion is often evident with some students thinking that only questionnaire data could possibly be primary data.

Primary Data Definition - Primary Data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

For example, one student took the definition and then read through an accounting system manual for his company and extracted all the functions and claimed that was primary data because he was going to use it to define what an accounts package should have by way of functionality but seemed unable to see that the manual had effectively done that already. (See workbook 6 section 6.6)

Research Method Justification - often students could not distinguish between Research Method and Data Collection Protocols. Research Methods are frameworks such as Case Study, Experiment, Action Research and so on. Collection protocols are based on: interview, questionnaire, observation, role playing, seminars, focus groups and so on. The sorts of justifications used are of the form "I have chosen case study because Saunders (2005, p92) said case studies are good... This is hopeless and implies no real thought. Justification must be built from a sound understanding of a particular Research Question, its expected form of outcome and the Primary Data needs and at least an overview of which method is likely to be best in a given situation. (see Workbook 7)

Practicality - many plans were over-complicated with students trying to use multiple methods and then ending up with masses of data they had no idea what to do with. There is only limited time and so students should be encouraged to focus on just one Research Method although of course several protocols may be involved.

Data Collections - in many cases all an examiner was able to see were results but often one simply could not tell if any primary data collection was involved and the results just seemed to appear 'out of the air'. The marking guide is quite specific and projects must be clear about both processed data and raw primary data collections. Without this we cannot feel confident that students have done any actual research. Typically, the collection of primary data is placed in an appendix and might be in the form of a summary table of questionnaires results or summarised transcripts. Correspondingly, the processed primary data collection is expressed as charts, graphs, tables, reports and so on in the body of the project report.

Processing - this is one of the most disappointing elements. Processing is all about transforming your collection of primary data into the form of outcome expected. Far too often all we see is the processing of individual primary data items with no attempt or very weak attempts to really supply an answer to the Research Question in the form that was specified.

Location - there were quite a few projects where it was more or less impossible to see where the primary data came from and often this was accompanied by a very ordinary set of results that could have been written by almost anybody with a superficial knowledge of the subject area.

9.8.6 Research Results Processing

There were some very good examples but often this section was very routine and very disappointing.

Repeating - it was very common to see a chart for example, displayed and then underneath the student simply repeated the data that was in the chart in words. Such a practice is worthless. What any data related narrative is supposed to do is to tell the reader what the data means and what implication it might have - that is we expect to see some analysis and evaluation of the data in terms of the Research Question.

Focus - the focus of processing the primary data is to create a kind of transformation that generates from the collection of primary data the expected project outcome - unfortunately, this aspect was often absent. Typically in a survey for instance we have page after page of charts analysing individual data items but no attempt to sum it all up and reach a conclusion based around the Research Question.

9.8.7 Evaluation and Conclusions

These sections in a lot of student work are indistinguishable. The reason there are two sections with marks attached is because:

Evaluation - here one focuses specifically on the project outcome and research methods - that is we evaluate our product (outcome) and the methods used to generate it. Notice here this is NOT about generating the outcome that would have been done in the research processing section

Conclusions - here the attempt is made to say what it all means - that is trying to generalize the findings. So for example, suppose the outcome is about the use of Agent technology in eCommerce web sites then in conclusions one might try to say what a particular project outcome means for any eCommerce site or in fact any website. In a similar kind of way, if a particular application had been built we might try to say whether it might be applicable in other situations or whether some features of the design can be transferred to all applications of that type.

9.8.8 Ignorance of Project Marking Criteria

Many students show an almost complete disregard for the way a project is marked and so often automatically lose marks. Students must therefore carefully study the marking forms so that they know what components are regarded as essential to any project and therefore carry marks. (See workbook 11 or 12 as appropriate)

10. WORKBOOK 10 – FORM: PROJECT SUBMISSION

This form **must** be completed and included in your project submission. If you are unable to tick every box then your work is not ready for submission. If boxes are ticked and it is subsequently found that the relevant element is not present it will be taken as a deliberate attempt to falsify the record and regarded as a fail.

Project Word Count	Exclude appendices. If maximum is exceeded marks may be lost or the project rejected
	The report length is within the stated guidelines (15,000 words maximum excluding appendices)
	I have included all making elements indicated in workbook 11 Or 12 as appropriate and noted the marking guidance notes
	I have studied the guidance notes on common project faults found in section 9.6
	I have prepared two bound copies of all my project work including any separate appendices
	I understand that I may use one or both sides of the paper when printing the report.
	I have included a full contents list, table list and diagram list all numbered consistently
	I have used good quality A4 paper, normally in portrait orientation with a weight between of 80 and 100gsm.
	I have made sure that the pages are in the right order and none are missing
	I have used MS word .doc format
	I have formatted the front cover and title page as required and added the necessary plagiarism declaration.
	All my text is single line spaced at 6 lines per inch/25.4 mm.
	All my main text, including headings is in 12-point font (Arial Narrow is recommended)
	All my text in tables and diagrams is 10-point font (Arial Narrow is recommended)
	All main text is right and left justified
	No headings at whatever level are indented
	Headings are NOT followed by a blank line
	Headings are in the same font and size as the main text but are shown in bold type
	No numbered headings are orphaned (that is all heading must be followed by some text not immediately by another heading)
	I have used a single blank line to separate paragraphs
	All chapters and appendices are numbered sequentially (1, 2, 3,...)
	All subsections are numbered (2.1, 2.2,...) and none of my sections numbers exceed three levels (1.2.1, 1.2.3 ...)
	All my margins: (top, bottom, left and right) are 20mm
	Pages have centred footers in 10-pt Arial Narrow: Page 12 of 97 - J.J. Letto HEMIS No. 567543 Submission Date: 2004/05
	I have cited other people's work properly using the Harvard APA format
	I have included all citations in my list of references
	My abstract accurately summarises all of the report, not just parts of it
	All my chapters and appendices start on a new page
	I have included appendices, where appropriate, covering: project specification, Project Plan, Requirements document(s), design document, screen shots, source code, user documentation, test results, evaluation results, questionnaires, etc.
	My supervisor has read each chapter as the work progressed.
	My supervisor has read the whole report
	I understand that indented sentences can be used where appropriate but bullets are not recommended (see 9.3.1)
	I understand that page headers are not required
	I understand that each of my chapters should start with an introductory section that explains what the chapter is about
	I understand that each of my chapters should end with a summary and a helpful link to the next chapter
	I have fixed a copy in .doc format of the project document and any appendices on floppy/CD/DVD to my project submission
	All my primary data (including requirement data) is original to this study and collected by me for this specific project purpose
	Engineering Projects only - I have included an executable file of my application on an attached floppy/CD/DVD
	Engineering Projects only - Application Operating instruction are on the attached floppy/CD/DVD as well as in the appendix
	Engineering Projects only – In my application I have not used illegal copies of any software or included any software where there is an expiry date which may render the application inoperable in the future.
	Engineering Projects only - I understand that the copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If, and only if, this is not possible then I have included in my project a supervisor signed set of screen shots in the appendix confirming that he/she has viewed the application in action.
Signature of Student. Date.	

11. WORKBOOK 11 – FORM: STUDY PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

STUDY STYLE		Postgraduate Project Marking Form						STUDY STYLE	
Name of Student							HEMIS No.		
Brief Project Title							Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion						Re-Work	New Topic	
Name: Supervisor									
Name: Marker									
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker		
Project Unit	PJ.NCC								
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected						
External Examiner	N	Y	Refer to the External Examiner (if "Y" add comment in section G)						
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit						
References: See Workbook 11 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes									
Section A - Marks for Planning and Preparation							Weight	Mark	
1.	Project specification, including project plan						5		
2.	Review of the topic area literature						15		
Sub-Total							20		
Section B - Marks for Project Introduction									
3.	Presenting problem and its exploration including the Research Question						5		
4.	Discussion of the project's scope, scale, aim and objectives						10		
Sub-Total							15		
Section C - Marks for Project Primary Data Research and Outcome Generation									
5.	Selection and justification of Research Method						5		
6.	Primary data collection plan including data specification						10		
7.	Primary data processing plan to get expected outcome						10		
8.	Presentation and discussion of the collection of Primary Data						10		
9.	Description and discussion of main project outcome						10		
Sub-Total							45		
Section D - Marks for Project Evaluation and Conclusions									
10.	Evaluation of the project outcome (Project Specific)						5		
11.	Evaluation of project practice (Project Specific)						5		
12.	Statement of conclusions and reflections (Project Generalisations)						10		
Sub-Total							20		
Section E – Qualitative Assessment matrix based on University Grade Criteria									
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words			
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless			
3.	Report structure	very poor	poor	satisfactory	good	excellent			
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report			
5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours			
6.	Project idea	trivial	easy	modest	challenging	Difficult			

7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Primary data collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Data processing	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
14.	Main project outcome	Worthless	obvious	useful	original	exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Study Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes found in Workbook 14.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.2 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the topic area literature

Reference: Workbook 5 section 5.2 and 5.6 in particular, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers and generally be focused on the central project topic. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and its exploration including the Research Question

Reference: Workbook 3 section 3.3 and 3.5.1, Workbook 6 sections 6.2, 6.6 and 6.7 and Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Research Question with a defined form of answer (project outcome). It is very common to see an expression of a problem as "my problem is to find a solution to..." or expressed in such a way that it is in effect a solution and such expressions are indicative of students who do not know what the problem is but nevertheless know what the solution is. Similarly, students who list multiple problems, have no Research Question (or a very poor one) and do not discuss the form of outcome expected are embarking upon projects where there is no clear focus and these typically fragment when it comes to the core research and one most often cannot find any clear project outcome later in the work. It is also useful at this stage if there is some indication of the Basic Activity for Generating Data (BAGeD) so that one can feel sure that the student is aware of what primary data they need in order to generate the intended outcome.

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.2 (example), Workbook 6 section 6.1 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition, expected form of outcome and Research Question all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Selection and justification of Research Method

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful choice of Research Method focused on resolving the stated problem theme. In practice this implies a consideration of primary data needs, location of primary data and the collection protocols that might be used. Markers should guard against rationales that amount to saying that some text book or other said method X or Y was good for certain kinds of scenario – that is copies of generalisations about Research Methods found in books do not amount to a rational for a specific research situation. Furthermore, markers need to feel confident that the student understands the distinction between a Research Method and the collection protocols used within them.

6. Primary data collection plan including data specification

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

This is a crucial stage in a research based project and markers must be confident that the plan is practical. A marker must look for a clear core activity represented by a statement about of BAGeD and that core activity should be surrounded by whatever other processes are needed to ensure reliable collection of the primary data. The whole primary data collection plan has four steps which must be visible in the project document: data definition, data location, data collection and how the whole collection of primary data is to be presented. Markers should also take care that the formation of a collection of primary data is not confused with the processing of it to get the stated project outcome.

7. Primary data processing plan and presentation of the expected outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for clear evidence that the student has taken the collection of primary data they obtained earlier in the project and now process that whole collection to get to a clear presentation of the project outcome. It is therefore important that markers can see what processes were applied to the collection of primary data to get the outcome – without this process visibility there is no evidence as to how the project outcome was actually obtained. Markers should be wary of processing plans that say such things as “I will look at the data” or “I will analyze the data” or “I will use SPSS” as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same data collection they could apply the same processes and get the same or at least a very similar outcome.
Markers should also be aware that very often students will often process individual data items – such as might be found on a questionnaire, but never get to a point where the stated project outcome is derived from the collection of data.
8. Presentation and discussion of the collection of Primary Data
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for visible signs of the collected primary data. The primary data collection is most often presented in tabular form in the appendix and might be displayed as graphs, charts, tables or diagrams in the main project document.
9. Expression and description of main project outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
The intended project outcome must be clearly visible – for example if the intended outcome is a model then that must be clearly shown in some acceptable form and be based on the processing plan outline in section 7. Markers must therefore take great care that the presentation of primary data and the processing of individual data items in the collection are not offered as a substitute for the student generating the intended project outcome.
Section D - Marks for Project Evaluation and Conclusions
10. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project outcome so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution (project outcome) or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project outcome. The section is not intended for vague thoughts about the topic but a considered evaluation of the project outcome when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
11. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate here. This section is important as this is where one expects to find some information on what the student has learned about the way they work and the tools they used. It is unfortunately often the case that students have very little idea about what they did apart from stating vague activities such as “look at”, “analyze” or “use SPSS” so without anything concrete to evaluate they resort to the routine and say “the survey process went very well” or “my case studies generated useful data” or else they simply ignore this form of evaluation altogether. Evaluation of project practice is difficult and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking ‘how did I do it’, ‘was it successful’ and ‘could I or should I on reflection have done it another way’. Additionally, one needs to be aware of any constraints involved, including time management and particular skills that might have impacted on the use of best possible practices.
12. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a project outcome was based on case studies and the outcome was a review of IT outsourcing in Hong Kong then here we might expect to see the student consider the outcome he obtained which refers to Hong Kong and then consider and discuss whether that outcome has wide applicability, for example, to China, South East Asia or even the world as part of a Global economy or is it just specific to that local situation. Essentially, one is asking what do the outcome ‘mean’ when set in a wider setting. It follows that the focus of awarding marks here is for project generalisations.
It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such as future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

12. WORKBOOK 12 – FORM: ENGINEERING PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

ENGINEERING STYLE		Postgraduate Project Marking Form				ENGINEERING STYLE	
Name of Student					HEMIS No.		
Brief Project Title					Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion				Re-Work	New Topic	
Name: Supervisor							
Name: Marker							
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker
Project Unit	PJ.PEA						
Plagiarism	N	Y	Is PLAGIARISM or another unfair act suspected				
External Examiner	N	Y	Refer project to the External Examiner (if "Y" complete section G)				
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit				
References: See Workbook 12 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes							
Section A - Marks for Planning and Preparation					Weight	Mark	
1.	Project specification, including project plan				5		
2.	Review of the application/product area and its client/business setting				10		
Sub-Total					15		
Section B - Marks for Project Introduction							
3.	Presenting problem and outline proposal				5		
4.	Discussion of the project scope, scale, constraints, aim and objectives				10		
Sub-Total					15		
Section C - Marks for Project Primary Data Research and Outcome Generation							
5.	Detailed requirements collection plan based on proposal				5		
6.	Analysis of requirements: functional, performance, technical and usability				5		
7.	Presentation, analysis and discussion of the design				10		
8.	Discussion of build process and design implementation				10		
9.	Application testing process and results				5		
10.	Implementation plans				5		
11.	Attributes of the project artefact (e.g. quality, reliability, etc)				10		
Sub-Total					50		
Section D - Marks for Project Evaluation and Conclusions							
12.	Evaluation of project product against requirements (project Specific)				5		
13.	Evaluation of project practice (project specific)				5		
14.	Statement of conclusions and reflections (project generalisations)				10		
Sub-Total					20		
Section E – Qualitative Assessment matrix based on University Grade Criteria							
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words	
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless	
3.	Report structure	very poor	poor	satisfactory	good	Excellent	
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report	

5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours
6.	Project idea	trivial	easy	modest	challenging	difficult
7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Requirements Collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Design Expression	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
15.	Artefact Evaluation	worthless	obvious	useful	original	Exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Engineering Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.1 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the application/product area and its client/business setting

Reference: Workbook 5 section 5.2 and 5.6, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers. In Engineering projects the expectation is that the review will focus on the application area and be in enough detail to at least understand and gather the requirements. It is permitted to include technical material if they have a special or unusual significance to the application area but in so doing students must be aware that the routine inclusion of what at this level might be regarded as common knowledge in computing/IT will not attract any marks. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and Outline Proposal

Reference: Workbook 3 section 3.3 and 3.5.1 Workbook 6.2 and 6.5, Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Application Outline expressed as a functional description. It is very common to see an expression of a problem as "my problem is to find a solution to..." and this is indicative of students who do not know what the problem is but nevertheless know what the solution is. Students who list multiple problems, have no functional description (or a very poor one) are indicative of projects where there is no clear focus and these typically fragment when it comes to requirements gathering and often end in a very trivial application. Markers should be aware that students may avoid giving a functional description and instead offer a generic architectural one and this must be penalised as the student clearly does not know what function the application supplies

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.1 (example), Workbook 6 section 6.11, 6.9 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition and Application Outline all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Detailed requirements collection plan based on proposal

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful consideration of the Requirement Gathering process focused on obtaining sufficient information to build the intended application and resolve the stated problem theme. In practice this implies a consideration of application functions, location of requirements data and the collection protocols that might be used. Normally in research one would expect a rationale for the choice of Research Method but for Engineering projects it is taken for granted that the method is requirements gathering. Instead one should look for a clear focus on constructing a feasible and comprehensive requirements document based on the application outline. Furthermore, markers need to feel confident that the student understands the distinction between Requirement Gathering as a Research Method and the collection protocols used within it.

6. Analysis of requirements: functional, performance, technical and usability

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers must look for a clear Application Proposal and a requirements catalogue. Here one needs to see a discussion of the requirements to ensure they are credible (realistic), comprehensive, complete and stakeholders have been considered. One might also usefully consider the approach that was taken to gain them and whether they are of the form of strategic, tactical or operational.

7. Presentation, analysis and discussion of the design
Reference: Workbook 9 sections 9.6.5 and 9.6.6 and Workbook 7 section 7.9
Marks are awarded here for clear evidence that the student has taken the requirements obtained earlier in the project and processed them to get a suitable design. Therefore, markers must be able to see a clear link from requirements to design and where necessary observe how the requirements were processed. Markers should be wary of processing plans that say such things as "I will look at the requirements" or "I will analyze the requirements" as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same requirements they could apply the same processes and get the same or at least a very similar outcome.
8. Discussion of build process and design implementation
Reference: Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for a rational discussion as to what architecture, components, languages and tools and so on are needed to best implement the design. This discussion may also imply the various situation constraints have to be considered as well.
9. Application testing process and results
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers must look for evidences of a testing plan and a consideration of test results. Typically the plan and results are placed in the main project document in outline form with the details in an appendix. Often students will just discuss white or black box testing or regression testing or something similar but without any actual test plans or results – in such cases marks should not be awarded as these materials is considered common knowledge at this level – however brief references to it are permitted.
10. Implementation plans
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a comprehensive implementation plan – it need not be extensive or in minute detail but it should cover installation, user training, data conversion/loading, change over, user acceptance and hand-over.
11. Attributes of the project artefact (e.g. quality, reliability, etc)
Reference: none
The intended project application must be clearly visible and available to run directly from a disc or DVD. Markers are to award marks based on their perception of the general quality of the application if they were to put themselves in the place of a user. Assessment may then consider colour scheme, ease of use, operating instructions, presentation (does it look as if its finished), speed, etc.
Section D - Marks for Project Evaluation and Conclusions
12. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project application so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project application. The section is not intended for vague thoughts about the situation or application but a considered evaluation of the project application when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
13. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate. This is where one expects to find some information on what the student has learned, the way they work and the tools they used. It is often the case that students have very little idea what they did apart from being able to state vague activities such "look at" or "analyze" so without anything concrete to evaluate they resort to the routine and say "the survey process went very well" or "the UML modelling was straightforward" or else they simply ignore this form of evaluation. Evaluation of project practice is difficult because the student must ask searching questions related to process success and the notion of good and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way' or "what were my constraints".
14. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a an application was for eCommerce selling shoes it might be possible to ask what aspect of that application could be re-used to sell other product. It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

13. WORKBOOK 13 – FORM: PROJECT MARKING RECONCILIATION

The form shown below is included for reference only so that you can see how your project will be marked.

Project Mark Reconciliation Form		Final Agreed Mark (%)	
Name of Student			
Brief Project Title			
Name: Supervisor			
Name: Second Marker			
Name: 3rd Marker			
<p>Cause – in this box, describe, for each applicable section, why the marking disagreement occurred.</p> <p>Rationale – in this box, If a mark can be agreed, explain the rationale used to reach agreement. Please note that it is only necessary to agree the total mark for each section not individual category marks.</p> <p>Irreconcilable - If you cannot agree a mark leave rationale blank and it will be filled in by a third marker who will place a tick in the small square box.</p>			
Section A - Marks for Planning and Preparation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section B - Marks for Project Introduction		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section C - Marks for Project Primary Research and Outcome Generation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section D - Marks for Project Evaluation and Conclusions		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			

14. WORKBOOK 14 – SUPERVISION AND MARKING GENERAL GUIDANCE NOTES

1. **Presented Work** - Marker's are reminded that any marks awarded must be solely based on the assessment of work presented within the mark categories listed on the mark forms. It is not permitted to award marks for "hard worker" or "tried very hard" or "was a good student" or any similar observation as there are no relevant mark categories and this kind of criteria is almost impossible to evidence.

When an Engineering artefact is presented it should be viewed in action to ascertain the mark for "Attributes of the Project Artefact". The copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If this is not the case then markers must assume that there is no evidence for the application and set the mark accordingly.

2. **Word Count** – on the project submission form there is a space for a word count (excluding appendices) and if this is exceeded then it is indicative of a deliberate attempt to go beyond recommendations and you may therefore find that it leads to laboured descriptions or inclusion of irrelevant material in the project document and you should therefore mark accordingly.
3. **Structure** – mark categories do not necessarily represent chapters in a project document and so Marker's need to be aware that a particular project may be structured in a way that does not correspond to the sequence presented on the mark forms (though it is recommended to do this when possible). However, all the elements on the marking form must be visible in the work presented.

Although it is recommended that the mark form sequences be followed in the project document that does not mean that there has to be a chapter for each mark category. Students, therefore, should be encouraged to merge sections in order to produce a concise document. For example, it is perfectly possible and reasonable to merge the two evaluation sections and conclusions into one chapter as long as the relevant mark elements are still visible.

4. **Appropriateness** - any work presented must be within the prescribed subject area for the course. If a marker suspects that this is not the case then they should consult with the relevant course leader for clarification. In such accepted cases markers must regard the primary data and its processing as not being appropriate and mark with that in mind.
5. **Evidence** - the project report or appendix must contain sufficient evidence that the core project research work has been done (not the literature review). That is, in the case of study project a marker must be able to see the primary data collection appropriately presented (usually in an appendix). In the case of Engineering projects it must be possible to see a suitable requirement document or catalogue (possibly in the appendix). Once the primary data is visible then it must also be possible to see how that data was transformed into the intended project outcome.
6. **Literature Support** - when marking Literature Reviews their content must be seen to be focused on the topic area and address clearly the associated problem theme without any irrelevant material with the intention of offering a concise discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (see section 5.1)
7. **Grade tables** - markers must be aware of the criteria associated with awarding a given overall mark as they may be required to justify it to the UAB in terms of the criteria stated in the table shown below.
8. **Process** – when marking it is important that the process used to get an outcome by the student is visible in the project document. In practice this means that it is possible to perform the following trace: presenting problem, discussion of how problem might be resolved, suggested form of project outcome, research design and execution, generation of stated outcome, evaluation and conclusions – viz:

Engineering – typically, the process starts with a business related or technical problem theme leading to a research plan for the collection and discussion of requirements and their transformation into a suitable design and associated architecture. From this there should follow a build, implement and testing process with the whole project completed with suitable project specific evaluations and conclusions containing generalisations.


Study – typically, the process starts with a business or strategic IT related problem theme leading to a research plan for the collection and discussion of primary data and its transformation into an outcome that would resolve or go some way to resolving the stated problem theme. The whole

project is then completed with suitable project specific evaluations and conclusions containing generalisations.

Marks	Master's Level Grade Criteria
70 – 100	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Excellent work - able to express an original reasoned argument in a lucid manner by reviewing & critiquing a wide range of material. Original, critical thinking based on outstanding insight, knowledge & understanding of material. Material contributes to current understanding & is of potentially publishable quality in terms of presentation and content ▪ Wide reaching research showing breadth & depth of sources
60 – 69	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Clear, balanced coherent critical & rigorous analysis of the subject matter. Detailed understanding of knowledge & theory expressed with clarity ▪ Extensive use of relevant & current literature to view topic in perspective, analyse context & develop new explanations and theories
50 – 59	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Detailed review and grasp of pertinent issues & a critical contextual overview of the literature. Thorough knowledge of theory and methods & uses this to underpin arguments and conclusions ▪ Confidence in understanding and using literature
40 – 49	<ul style="list-style-type: none"> ▪ Demonstrates grasp of key concepts & an ability to develop & support an argument in a predominately descriptive way with valid conclusions draw from the research ▪ Familiarity with key literature which is cited and presented according to convention ▪ Logical & clear structure, well-organised with good use of language and supporting material
0 – 39	<p>FAIL – Some knowledge of relevant concepts & literature but significant gaps in understanding and/or knowledge. Little attempt at evaluation, conclusions vague, ambiguous & not based on researched material. Limited or inappropriate research. Deficits in length, structure, presentation &/or prose.</p>

15. WORKBOOK 15 – FORM: UNIT FEEDBACK REPORT

This form may be used by you to feedback to the University your experiences in the courses. It is normally sent to your tutor at the end of the course.

Unit Level Feedback – Delivery Evaluation for Online Units										FF.2.3		Page 1 of 1	
This student feedback questionnaire is intended to help students provide constructive feedback to the unit lecturer.													
Student Name (Optional)										Cohort			
Unit Name													
Lecturer													
Q	 Good					Place a ✓ to rate each factor from strongly disagree to strongly agree in one of the 5 boxes							
1						Chat sessions started promptly.							
2						Char sessions were structured usefully for learning.							
3						Chat content helped my understanding							
4						Chat Tutor handled student questions sympathetically							
5						Chat Tutor used helpful examples where necessary							
6						Chat Tutor answered session questions in a helpful manner.							
7						Chat sessions stimulated me to think beyond the material delivered.							
8						Chat topics were often related to real-world situations.							
9						Chat Tutor encouraged students to participate during the session.							
10						The Tutor was expert in the subject area.							
11						The written notes provided were helpful to my learning.							
12						The study pack Workbooks were helpful in my assessment preparation.							
13						The 5 milestone tests helped me to confirm my knowledge.							
14						Tutor responded in a timely fashion to discussion board questions.							
15						Tutor responded in a timely to my email communications.							
16						Tutor was sensitive to the problems of individual students.							
17						The assessed work stimulated me to think deeply about my project.							
18						Feedback on my progress was available.							
19						The topic approval process helped me think clearly about my project.							
20						Written assignment specifications were clear.							
						For Official Use Only							
General Comments:													

I. Title: Document Management Strategies

II. Background: Managing documents is important for any organization. Every company has its own document storage and retrieval systems. A document management system (DMS) is a set of computer programs to track and store electronic documents and images. Document management systems basically provide storage, security, metadata, versioning as well as indexing and retrieval capabilities. DMS is increasingly being used in UAE both in private as well as government sector. e-Tawasul-Document Management system of UAE e-government is one such example.

III. Presenting Problem Definition: Despite being time, space consuming and expensive to maintain, use of traditional DMS still persists. Adopting proper document management strategy is therefore very important. DMS has far more potential than merely reducing paper work. Organizations in UAE need proper DMS strategies to efficiently track and store documents.

III. Real World Target: Inform UAE companies about the advantages of an efficient DMS. The reduced time for data retrieval, storage and security can help companies reduce storage, distribution and people costs.

IV. Research Questions: What are the bottlenecks in present DMS in UAE? How can they be overcome? How can they be optimized to reduce storage, distribution and people costs?

V. Personal Theory: DMS is very important for an organization. I believe that DMS can significantly help UAE organizations in storage, retrieval, filing, security, archival, retention, distribution, workflow and creation of documents. DMS can help UAE companies to reduce storage, distribution and people costs.

VI. Intended Project Outcome: The project aims to come up with strategies for efficient document management. It will analyze the reasons for Data Management bottlenecks in UAE organizations and suggest strategies and best practices to overcome them. Proper approach for migrating from a traditional to a modern DMS will also be laid down.

VII. Strategic IT Value: DMS not only helps in cost reduction but also in increased productivity of the employees. UAE Organizations can achieve substantial business benefits like improved customer service, reduced order-processing time, faster internal approvals, improved AR and collections, reduced processing errors and increased business process control by implementing modern DMS strategies.

VIII. Design for Collecting Primary Data: I will analyze bottlenecks and complications in document management processes. It will involve analyzing present document management processes in UAE organizations. I will interview key people in the organizations for collecting primary data.

IX. Design for Processing Primary Data: I will use the collected primary data to analyze reasons behind DMS bottlenecks. I will also evaluate successful approaches adopted in organizations to tackle them. I will then suggest effective strategies for document management.

Project Proposal –

1. Title –Document Management strategies (78)

2. Background-

Document management strategy is intrinsically linked to the development, evolution and optimization of its operating processes in many organizations. Document Management for the Enterprise simplifies the principles of document engineering and management. Document management is one tool among several collaborative computing tools necessary for users to manage information.

3. Presenting market potential –

The company's massive scope of operations and their geographical spread meant that large volumes of data of varied genre were being created at dispersed locations. So now it is essential for organizations to organize contents/ documents in a way that optimized its usefulness to multiple users across the organization. Document management solution should reduce cost of ownership for both purchase and administration by integrating document management into an existing collaborative/information management solution.

4. Real-world target-

Convince organization to implement document management strategies which will enable them to access information dispersed throughout the organization, whether local or global and effectively provides quick, easy access to information regardless of the source.

5. Research question –

To develop and agree whole-life document management strategy and implement a solution that will cover both internal and external procedures with standards for processes and document.

6. Personal theory –

To overcome information overload by giving users the ability to organize, filter, prioritize and manage a variety of data types we need to convince enterprises to implement document Management strategies in business processes.

7. Intended project outcome –

My expected outcome will be set of benefits and explanation of in- depth features and functionality of data management strategies in maintaining huge data bases in enterprises.

8. Strategic IT value –

By Uniting the various repositories for files and documents organization can keep track of their data bases by date, process, type, status and priority wise to efficiently maintain their business processes. Document management solution handles documents by electronically storing, organizing, indexing and filing. They can be retrieved when required, without any loss of time. The cost of miss management of documents is too high.

9. Design for collecting data –

Scope of this study to know the life cycle management of documents to draw what kind of benefits firms can make by implementing a document management system in current business processes.

10. Design for processing primary data -

Study the behavior and attitudes of different industries with the help of cases and tools which they have implemented and leveraging the strengths in best possible means to improve their customer centricity in low cost by using document management strategies.

Project Proposal –

1. Title – Impact of IT on international supply chain management (36)

2. Background-

Supply chain management (SCM) is the practice of coordinating the design, procurement, and flow of goods, services, information and finances, from raw material to parts supplier, to manufacturer to distributor, to retailer to consumer. This process includes product design, order generation, order taking, information feedback and the efficient and timely delivery of goods and services.

3. Presenting market potential –

Information technology and the Internet have revolutionized the way companies do business. They have changed the way organizations operate by enabling the re-engineering of sourcing, production and logistics processes

4. Real-world target-

The classic objective of logistics is to be able to have the right products in the right quantities (at the right place) at the right moment at minimal cost. Increased competition, ever expanding product variety, and more demanding consumers require more efficient supply chains

5. Research question –

How to effectively manage the supply chain using information technology is a topic of discussion in all levels of management, regardless of industries?

6. Personal theory –

I think IT in SCM presents both challenges and opportunities for supply chain managers because of its ability to collapse time and distance. Keeping this in mind firm needs to be understand the implication of supply chain management implementation in their transaction processes.

7. Intended project outcome –

My expected outcome will be a set of examples probing the utilization of IT in supporting supply chain management by developing a set of metrics to monitor the supply chain so that it is efficient, costs less and delivers high quality and value to customers.

8. Strategic IT value –

This research study provides a realistic portrayal of a key benefit of information technologies in supporting buyer-seller relationships. Using IT in SCM companies can follow a practice known as just-in-time manufacturing, and it allows companies to reduce the amount of inventory that they keep. This can cut costs substantially, since they no longer required to produce and store excess goods.

9. Design for collecting data –

I will collect the sample data from companies willing to share openly their results which have achieved using Information technology in their supply chain management.

10. Design for processing primary data –

On data collection an analysis will be done which will include the process description and the technology used. The in-depth benefits will be identified on the basis of qualitative and quantitative data available.

Project Proposal –

1. Title – IT and Logistics Management (31)

2. Background-

Logistics Management is that part of Supply Chain Management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements

Presenting market potential –

Information and communications technologies are revolutionizing the scope and scale of logistic management. Online data exchange is transforming business practices, allowing managers to capture and track complex data more effectively. Orders and various products related to that order can easily be traced. It is also possible to exchange information among entities within the value chain, thus greatly improving customer-provider relationships.

3. Real-world target-

Once Information technology gets involved in Logistic management, a number of benefits can be noticed like electronic trading of goods and services, online tracking of goods, carrying out banking transactions and processes electronically and electronic submission of customs documentations and declarations and payment of duties and taxes electronically.

4. Research question –

How organizations can fully utilize their IT capabilities to make their logistic management activities stronger in presence of constraints like lack of coordination between supplier or buyer etc.

5. Personal theory –

Presence of IT has taken over routine duties, which it performs much more efficiently and accurately than human beings, thereby providing individuals and teams with ample time for engagement in value creation.

6. Intended project outcome –

My project outcome will answer some of your questions like how will the widespread use of IT change the ways people work together? Improvements in IT have significantly changed how information can be processed and communicated, which in turn has led to increased interest in the study of interdependencies between organizations.

8. Strategic IT value –

Once organization starts using IT with Logistic management it will help them in enabling the move from centralized to decentralized management without any loss of information at any level; other advantages include speed/timely delivery, reliability, cost saving, security, etc.

9. Design for collecting data –

My procedure will explain the case studies in which IT has made performed a significant role in maintaining material management, ease the transaction process and shown transparency at every step to make product process flow effective.

10. Design for processing primary data -

After collecting data I will classify my study in to industries for determining the quality and competitive advantage of organizations by highlighting role of IT in logistic management.

Project Proposal –

1. Title – Business Advantages of Sarbanes Oxley compliance (181)

2. Background-

Sarbanes-Oxley is a comprehensive law designed to prevent corporate crime, and it fundamentally changes the business environment. Sarbanes-Oxley requires annual assessments of the effectiveness of whatever internal controls the corporation has established. The Act turns automatic document destruction into a process that must be monitored, justified, and carefully administered.

3. Presenting market potential –

Sarbanes-Oxley is about improving transparency and accountability in business processes and corporate accounting to restore confidence in public markets. It regulates processes and business practices. Sarbanes-Oxley compliance provides public companies with a golden opportunity to enhance the quality of their financial operations. Companies can achieve a return on compliance spending by using SOX as a lever to improve business processes- processes mapped as part of their SOX documentation.

4. Real-world target-

Educate and convince organization to achieve process improvements that will increase business efficiencies and competitive advantage after implanting SOA in their business process

5. Research question –

How Sarbanes-Oxley Compliance describes the new realities facing firms, spells out the steps needed to meet the new requirements, and offers techniques for evaluation and continuous self-assessment that will become a blueprint for survival in this turbulent business environment.

6. Personal theory –

Sarbanes-Oxley compliance has forced and is continuing to force companies to reengineer their business processes, which can improve overall enterprise risk management and business performance and therefore create enormous productivity gains

7. Intended project outcome –

My outcome will tell you the steps that leading companies are taking to manage their Sarbanes-Oxley compliance more efficiently and cost-effectively and also explore strategies that use workforce-related data as a means to increase the visibility and transparency of financial information and at the same time gain more control.

8. Strategic IT value –

The outcome after implementing Sarbanes-Oxley act in business will let organization to achieve high performance with low risk involvement and high level of transparency. Organizations can benefit from automated controls such as identity and access management, which reduce the effort, time and cost associated with audits.

9. Design for collecting data –

My process will evaluate cases where Sarbanes-Oxley act compliance has shown high level of commitment in making business processes transparent and profitable.

10. Design for processing primary data -

After collecting data I will classify my study in to industries for determining the quality and competitive advantage of organizations by implementing Sarbanes-Oxley act.

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~~424~~
~~525~~
626

250 word

Pavilion
Open

Poril - 4500

Portec? - 2000

Duc P. 12000 - 15000

Voip

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Mahira@ace-uae.com

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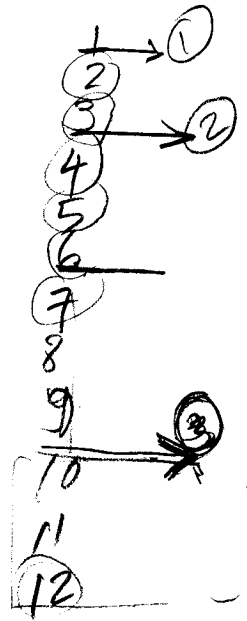
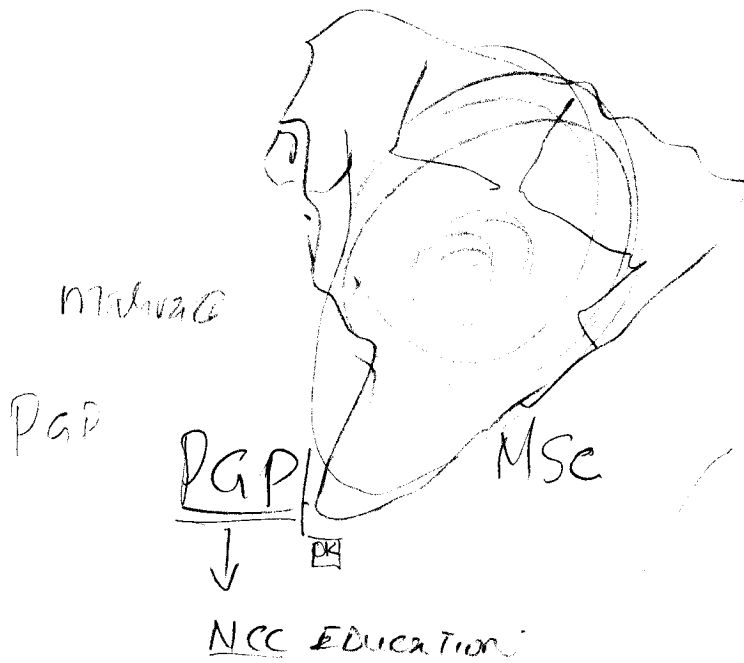
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- ① PGP → 1/3/2007
- ① Computer Net. Net. (Pass)
 - ② Task Man. — ✓
 - ③ Business Strage. — ✓
 - ④ Next five years. — ✓

WebCT

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②

- ① Pro file. 250 word. = 1000 Dipl. —
- ② Portman 450 word. = (cr) —
- ③ Project SP 3000 —
- ④ final 12/000
- A —
 - B —
 - C —
 - D —
 - E —

4. Real-World Target - Increase the effectiveness of implementing Sarbanes Oxley Compliance.

Tutor Comment - There is a hint of something good here but it does unfortunately sound as if it all about implementation and nothing about compliance. Now the student may have meant by implementation to include the idea that what we really want is secure compliance but in this case I don't think that entered his mind because he is fixated on this solution to the compliance problem. One should also be aware that observing or measuring "effectiveness" is not easy to do.

5. Research Question - How to implement Sarbanes Oxley Compliance with IT/IS automation in an effective way?

Tutor Comment - This is very poor indeed as in English it is very unlikely that anyone will understand this as even being a question at all. This is deplorable as the notes are explicit on this kind of error and so clearly the student has not bothered to study the relevant workbook section with any kind of care even though he has confirmed that he has. This is reprehensible behaviour, compounded by the fact that even though there was an exercise on this, that cannot have been attempted either.

Research Questions have 5 features: (SPITS) spotlight, problem, interrogative, target and suggestion. SO what can we find her if we are generous and see it as a question:

Spotlight - try to put the spotlight on where the primary data or information needed to answer the question might help come from.

Problem - this is about focusing on a single problem, so try to be as concise as you can.

Interrogative - what is your key interrogative word (how, why, what etc). You should note that some interrogatives need to use two words if a proper question is to be formed. For example, "how" on its own will not normally make a question but when you say "how can.." it is clearly a question.

Target - think about what will happen in the real world if you can resolve the problem. For example, it might be your target was to gain efficiency improvements, provide or enable better communication, increased accuracy and so on. It is also possible, but usually unwise, to state the target negatively if this makes the wording of the question more natural and you will see examples of this in section 6.7.

Suggestion - here one thinks about the problem theme and simply asks what sort of answer and what form it might take. So sort of answer might be yes/no, an explanation, an exploration, a description and these sorts of answer might be expressed at the end of the project as a report, a model, a list and so on.

6. Intended Project Outcome - It is anticipated that this report will produce a clear implementation strategies in an effective way for Sarbanes Oxley Compliance. Some companies' example will be used for data processing and analysis.

Tutor Comment - recall that this student's Research Question asked "how" so we might reasonably have been expected to find the outcome as a process or procedure of some kind. Here we now find it's a set of strategies and I cannot see a strategy as defining a process so this looks inconsistent to me and I think he is guessing that this sounds convincing but has not thought it out and in my view has no idea what a strategy actually is. In the last sentence the student seems to be saying that in fact he will copy the strategies from other companies and that is effective plagiarism.

So if we are generous here we would say that he is going to collect a set of strategies from other companies and then he is going to look through them is some way to construct another set of strategies for a particular company. I don't like this because he is not extracting any primary data from the presenting problem situation at all and is assuming that company situations are all similar but of course if that is the case we might as well use the collected strategies without any processing at all.

7. Design for Collecting Primary Data - Basic Activity for Generating Data (BAGeD) will be used. My process is to draw up a list for all known types of automating Sarbanes Oxley Compliance operation products with companies' selection for future analysis.

Tutor Comment - there is a hint of a BAGeD but obviously by the way he refers to it in the first sentence he has no idea what it means and is just trying to cover up that fact. The second sentence is more useful where he suggests that the Basic Activity turns the spotlight onto known products (well we cannot list

7. Design for Collecting Primary Data - Basic Activity for Generating Data (BAGeD) will be used. My process is to draw up a list for all known types of automating Sarbanes Oxley Compliance operation products with companies' selection for future analysis.

8. Design for Processing Primary Data - As long as I have the primary data, I will separate them into different types since they comply different code components of Sarbanes Oxley Compliance. To successfully create my intended outcome, I will construct illustration strategies and produce report on efficiency on different kind of products and their compatibility for the companies.

Student Example 3

1. Project Title - The wireless technology how influences the development on video game industry

2. Project Setting - Nowadays, the wireless technology application is most popular, due to the wireless technology development become mature, almost everyone uses in the home or at work place. Now the wireless technology starts apply on the entertainment especially on video game industry, whether a hardware console manufacturers or a software developer would like to utilize the wireless technology to enhance connectivity that for attempting present the high speed and many-to-many video gaming environment, also changes the game mode and control method.

3. Presenting Problem Definition - In the market, some hardware console has applied the wireless technology currently, whether is the Wi-Fi or IR (infra red). However, these functions are used more frequently for Internet browsing or data sharing temporally that can't satisfy the video game player. The video game player would like to apply the wireless technology to play a game anywhere and make the many-to-many environment that allows the video game player and their competitors play the game together, even change the game control methods

4. Real-world Target - Through apply the wireless technology, the hardware console enhance supporting on high speed wireless connection and game control method. The software developer develops the many-to-many video gaming environment that allows the game player with this platform to play the game with their competitors which enlarge the customer base

5. Research Question - Wireless technology how influences the development on the video game industry which include the trend of hardware console manufacturers, trend of software developer and the player of video games

6. Intended Project Outcome - Apply the wireless technology on the video game industry. It will make another industry growth. The hardware console manufacturers and software developer will change the traditional concept in video game industry that affect the video game mode of video game player especially focus on the mobile gaming and online gaming market

7. Design for Collecting Primary Data - The BAGeD will be to identify the wireless technology how to influences the development on video game industry. My process will prepare a set of the question which including the hardware console manufacturers, the software developer and the video game player. The questionnaire is made accordingly and it will send via different channel, such as e-mail and forum for collect the meaningful data about the project title.

8. Design for Processing primary Data - One the primary data is collected from different channel. I will classify the data in threes main categories that are hardware console, software developer and video game player, also will prepare an illustration and strategy accordingly.

Research ①

Ideas

Statistic → Online

②

Research project

Strategic it outcome

it learning (I.T)

60%

- ~~at~~ proposal - 10 marks.
- ⑤ Online tests - 5 marks.
(multiple choice), on the notes
- Literature Review & Project Specification
- Static ~~test~~

Appendix E – Sample, letter of support format

All projects require a letter of support to confirm that the data being collected is new. The letter must:

1. Be on headed note paper and signed by a person in authority within the Company/College. Their name must be also stated in full as well as their status or position.
2. The letter(s) is to be scanned in colour and the image attached to the submitted Assessment 1a Part 3.
3. A typical wording would be as follows. However, the company/college may choose their own wording or add extra sections as they please.

Company Format

This format is to be used when your research project is based on gathering data from an organisation. This format is the norm. If you are using more than one organisation then you must supply a letter from each one unless you are using a large number, in which case you must use the College format.

Dear Sir,

My name
Re. Mr Victor Chow. Project: Planar Similarity – A new Synthetic Software Metric

I confirm that the named student is carrying out research at the above named company and I further understand that this research is part of the assessment to gain a Master's qualification. The work proposed by this student is new and I can confirm he is not using any pre-existing data.

The student has explained that the University will regard all data and results as confidential and it will only be made available to University tutors and the External Examiner and will not be published in any public forum without our full written company consent.

Any enquiries relating to this letter should be addressed to Dr Chin Wong of 0986 34571 or via email at chin.wong@ace.org.

Yours Sincerely

Manager
Dr Chin Wong
Technical Director (New Products Division)

To: Dr Tineke Fitch

fred.gardick@gmail.com

tineke.fitch@port.ac.uk

PgD College Format

This is the format to be used when your research project is based on gathering data from where there is no obvious organisation involved. This is expected to be the exception rather than the norm.

Dear Sir,

Re. Mr Victor Chow. Project: Planar Similarity – A new Synthetic Software Metric

I confirm that the named student is carrying out research on the above named topic and I further understand that this research is part of the assessment to gain a Master's qualification.

I have checked the student record and questioned him about previous project work and I am assured that the work proposed by this student is new and does not use existing data and that this is representative of a new project idea.

The student has explained that the University will regard all data and results as confidential and it will only be made available to University tutors and the External Examiner and will not be published in any public forum.

Any enquiries relating to this letter should be addressed to Dr Philip Ling of 0986 34571 or via email at p.link@ace.uae.org.

Yours Sincerely

Dr Phillip Ling
Director of Studies

Integrated Systems

1	Attempting to integrate all systems in a company is unwise
2	Highly Integrated systems such as SAP increases worker commitment
3	Highly Integrated systems such as SAP increases worker stress
4	IT/Computing standardization of systems and the impact on business success
5	IT/Computing standardization of systems and the impact on business policy
6	Legacy Data and BI Tools sets
7	Leveraging Data and BI tools sets
8	Lightweight Enterprise Architectures - a way forward in cost control
9	Microsoft Dynamics – A challenge to SAP and Oracle
10	Migration Practices for Legacy Systems and Business Planning
11	Modern HRM systems have had a major impact on recruitment and retention of staff in large organizations.
12	Service-Oriented Architectures (SOA) – A new breed of Applications
13	Taking a cross-organisational approach to IT
14	The impact of IT on global manufacturers

General IT Products

1	Blog Monitoring – A possible business Strategy?
2	Bloggging – A possible business Strategy
3	Bloggging – Is gagging bad for business
4	Business implications of the Web Bases OS
5	Implementation and training for BizTalk or Sharepoint Portal Server or Content Management Server etc
6	IT Collaboration Tools and Business Success (email, Intranets, shared files, desktops, user profiles etc)
7	Microsoft Office Business Scorecard Manager – A modern Management tool
8	Modern Software Development and its role is helping the disabled IT professionals
9	Optimisation of IT services (eg HP OpenView)
10	Search Engines and business Efficiency
11	The next wave – Computer Systems that never Fail
12	The next wave – computers that think like humans
13	The role of BizTalk or Sharepoint Portal Server or Content Management Server in business success
14	Voice activated input system and their efficiency in business situations (such as Via Voice)
15	Voice activated systems – a productivity tool
16	Web 2 a new model of usage
17	Web based desktop tools and their use in business
18	Web Services – The future for distributed systems (.NET and J2EE etc)

Document Management

1	Document Management and support for Critical Business processes
2	Document Management Strategies
3	eBooks and Readers – their use by business
4	Electronic Documents and Record Management
5	Strategic Issues in Document and Information Management

Theoretical Issues

1	IS needs must be matched to value in that IS systems can only be successful if there is a causal link to business success.
2	IT Application and Organisational Change
3	IT needs to be at the heart of all business plans
4	IT reporting functions and Business Instinct
5	Knowledge Management and its place IT planning/procurement/success etc
6	Mobile Technology Offers Staff a more satisfying work-life balance
7	Results oriented approach to the UI (instead of command-oriented – see 2006 MS office 12)
8	The Evolution of the Intelligent network and its business impact
9	The role of emotional intelligence in IT user support
10	The role of Web Content Accessibility Guidelines in moving web sites into the modern era
11	Trends towards shared resources on the Internet – A business Strategy

IT and Corporate Managements

1	Business Advantages of Sarbanes Oxley compliance
2	Business Costs associated with Sarbanes Oxley compliance
3	Compliance – an IT nightmare
4	Cyberslacking and corporate performance/losses
5	Developing a corporate Strategy for Document and Information Management
6	Flexible Working in IT – A way Forward
7	Gaining the business edge with IT
8	How company policy drives IT system selection
9	IS Management in the SME/large corporation/government etc
10	IT Strategies and External Business Factors
11	Management and IT Potential
12	Managers Manage but Technology Enables
13	Managing a business in and IT dominated world
14	Personal gadgets and Illegal Downloads – The curse of Organisations (iPod etc)
15	Strategies for Sarbanes Oxley compliance Implementations
16	The adaptive Enterprise (that is growing IT as it is needed)
17	The changing role of the IT professional
18	The characteristics of a Modern IT manager
19	The effect of company Policy on IT procurement
20	The effect of IT systems on company Policy
21	The Organisational Burden of Software Licensing Schemes
22	The role of IT as a strategic Business Resource
23	The Role of IT Certification in Implementation Strategies
24	The Role of IT Certification in Systems Operational Performance
25	The Role of IT Certification in terms of Strategic IT Development
26	The strategic Role of IT in business is Questionable

Email and Personal Communications

1	Dealing with email enquires in large corporations
2	eMail - a Business Nightmare
3	eMail and ISPs
4	eMail and the personal user
5	eMail currency and its impact on personal productivity
6	eMail storage Systems and their impact on business
7	Mobile email – Taking a business Lead
8	Phishing – a personal tragedy and a corporate nightmare?
9	Skype and its use as a viable business communication suite (and other similar systems)
10	SPAM – An analysis of common content
11	SPF (Sender Policy Framework) An Answer to SPAM
12	The impact of Spam on personal productivity
13	The role of eMail in a modern business Organization
14	Then effects on business of organizations such as SPEWS in limiting SPAM

Teleworking and Telemedicine

1	Telemedicine
2	Teleworkers and their Impact on IT security, business success, outsourcing etc.
3	Teleworking and IT professionals

IT Risk

1	Business Continuity Planning – A Replacement for IT Disaster Recover
2	Critical Incident Management in IT
3	Improving the Application of IT related Risk Management
4	IT and Business Risk
5	IT Infrastructure and Business Continuity Planning
6	Managing business Continuity planning with highly integrated systems
7	Possible cost-based processes as critical management tools with regard to IT

Please remember I don't want a copy of your job specification. I don't need to be impressed by who you are, I don't need to be amazed by all the things you know and your qualifications, I am not looking to employ you, I am not awarding any marks, I am not giving out any prizes I just need to feel I concisely and precisely know who you are, what you do and where your MSc project interests lie.

Appendix B – Submission Check List for Assessment 1a Part 3

This form must be included as an appendix to the submission of part 3 of this assessment and it is intended to show you that you have correctly formatted work and included all that is needed.

If you are unable to tick every box then your work is not ready for submission. If boxes are ticked and it is subsequently found that the relevant element is not present it will be taken as a deliberate attempt by you to falsify the record and the work and 2 marks will be deducted for every case where a ticked is used but found to be not a true statement.

Word Count		The maximum permitted word count is 3,000 excluding project plan and reference list.
1.		I understand that if ANY item ticked is found to be untrue 2 marks will be deducted.
2.		I have written down the word count and it does not exceed the permitted value
3.		I have include a short literature review as required
4.		I have included a specification as required using the latest format
5.		I have used the correct margins of 2cm top, bottom, right and left
6.		The work presented is in A4, MS .doc format using portrait orientation (project plan may be in landscape)
7.		I have used Arial narrow font at 12pt size except in the project plan, reading list and page footer where I have used 10pt.
8.		I have used a line spacing of 6 lines/inch
9.		Pages have centred footers in the form - Page 1 of 5 - J.J. Letto HEMIS No. 567543 Submission Date: 2004/05
10.		I have not used page headers
11.		All main text is right and left justified
12.		Headings are NOT followed by a blank line
13.		Headings are in the same font as the main text but are shown in bold
14.		I have used a blank line to separate paragraphs
15.		I have not numbered any paragraphs or sections
16.		I understand that indented sentences can be used where appropriate but bullets are not to be used
17.		The first page uses the assessment heading lines shown on the specification sample in workbook 3 section 3.5.2
18.		I have used the correct format for a specification as found in the sample contained in workbook 3 section 3.5.2
19.		The submission file is named with only my HEMIS No. (if anything else is added your file will be automatically deleted)
20.		I have sent my personal profile to the Research Methods tutor
21.		I have sent my induction checklist to the Research Methods tutor
22.		I have looked up and studied ALL the Workbook references mentioned in this assessment
23.		I have included all citation sources used in my work in my list of references
24.		My short Literature Review is not be made up of just quotes and paraphrase but is an evaluative dialogue
25.		I have cited other people's work properly using the Harvard APA format
26.		I have included a references list of at least 10 literature sources
27.		My reference list contains no more than thee books covering Research Methods and Statistics
28.		I have only used the citation form (Briggs 1999) for passing references to texts
29.		I have included at least 3 sources covering the core topic area of this research
30.		In the reference list no more that 20% are internet sources
31.		The specification includes a plan to get original data (primary data) and I do not have that data already
32.		I have ensured that the primary data collected can be used to generate a Strategic Business IT outcome of some kind.
33.		My data processing design will generate the stated outcome form and the plan is clear enough to be executed by anyone
34.		The project has a significant learning potential in the IT/computing field
35.		I understand for this degree only the project style known as "Study" is allowed.
36.		I have attached a scanned letter of support from the organization where I intend to collect data (see appendix E)
37.		Plagiarism Declaration - I confirm that the enclosed written work is entirely my own except where explicitly stated otherwise. I further declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I further understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

you have not used the format shown in the Workbook Pack Release 3.2c the proposal will not be assessed and you will have to do it again.

Checklist - The formatting details are set out in the checklist found in appendix B which must be included with your submission and is a declaration by you that the work is ready to submit.

Part 3: Section 1 – Literature Review worth up to 20 marks

References - see Workbook 4, Workbook 5 especially Section 5.1, 5.2 and 5.7 and Workbook 9 Section 9.6.5.

Process - In order to carry out the project work you must have a fully prepared mind and that preparation is carried out using a thorough Literature Review. However, in this section we only expect a short review so that the University can assess your commitment, scholarly assets and preparedness for moving to the project phase. It is hard to be precise here but a short review of between about 800 and 1,000 words is normally adequate.

Part 3: Section 2 – MSc Project Specification up to 65 marks

References - see Workbook 3 section 3.1, 3.3 and 3.5.2

Process - To write up this work use the study project style headings and format located at the above references. You are advised that the tutor is not permitted to read your specification before submission as it must be seen to be entirely your own work since it is a formal assessment. However, the tutor will be happy to accept specific questions or discuss aspects of your work related to the various research elements and principles. It is hard to be precise here but good specifications are typically about 1,500 to 2,000 words.

Warning - to be able to move to the project stage you **MUST** normally achieve a mark of at least 40 (about 65%) in the project specification.

It is therefore possible, that you could pass the Research Methods unit but be judged, because of a poor specification, as not yet ready to begin the project itself. If this happens to you will be allowed to just submit the project specification again.

Purpose - The purpose of this part of the work is to gain approval for a project idea from the University by writing a short MSc project proposal. This is assessed work so you will only be allowed one attempt to gain the full range of marks. If for whatever reason your idea is rejected you may make another attempt as soon as you can but in such a case the maximum mark you can attain for this work is 4 out of the available 10.

Topic Area Selection - Appendix D contains a list of topic idea, they do not have to be selected they are there to show you the range of possibilities in writing a project proposal - there is an example proposal in appendix A to this document. But recall, the key element is that you must be able to collect primary data and it must be possible to regard the topic as Strategic Business IT.

Study References - The following Workbook and section references are to the Student Workbook Pack Release 3.2c.

Encouragement - You **MUST** expect to go backwards and forwards many times over all the headings in the proposal until you have a concise, coherent and lucid proposal that is your very best work.

Submission - When your proposal is ready use WebCT email to send it to the Research Methods tutor in a text only (no formatting, no diagrams, no tables etc) message – it must **NOT** be sent as an attachment. You are advised to seek approval as soon as possible but it would be very unwise to try to do it until after the first two formal subject area chat sessions.

Supervision - If your project proposal is approved then you will be allocated a supervisor within about three weeks of the cut off date. It is very important therefore that you make sure the submission is sound because if it is not satisfactory you will not get a supervisor and you will have to wait until the results of the specification are available several weeks later. The standard is very high so unless you study with care all the references and produce your very best work you will not be allocated a supervisor.

Format and Word Limit - Write the proposal using the headings shown below but you must not exceed 500 words (including the headings and declaration). If the word limit is exceeded, any headings are missing, any headings are altered, the sequence of headings changed or any headings added the proposal will not be assessed and you will have to do it again and the marks capped at 4 out of the available 10.

All work is submitted with a declaration and this must be offered honestly. If you cannot offer the declaration then your work is not ready for submission. If the tutor feels, based on the quality of your submission, that you have not adequately prepared for this work by studying the references he will reject the work and tell you that in his opinion you have made a declaration with intent to deceive.

Project Proposal (Word Count =)

Declaration – I <student name> confirm that I have carefully studied all the Workbook references in constructing this proposal and that what is described here is a new work and is not copied from any source.

1. Title – Construct a title in not more than 100 characters, workbook 6 section 6.13 will help you do this.

2. Problem Setting – Give an overview of your problem setting as background to show how you identified the problem theme.

3. Presenting Problem Definition – define a single significant IT or IT related problem that you are trying to solve. See Workbook 6 section 6.5 and 6.9.

4. Real-World Target – state what real world benefit or effect there will be if the stated problem can be resolved or partially resolved. See Workbook 6 section 6.3 and see Workbook 3 Section 3.3 and 3.5.2.

5. Research Question – write a question you want to ask as a way of encapsulating the quest to resolve your problem theme with your stated target. Use Workbook 6 sections 6.7 and 6.9.

6. Intended Project Outcome – what is the form and content of your expected MSc project outcome that arises naturally out of your speculation about the problem and constitutes an answer to your Research Question? Use Workbook 6 sections 6.2, 6.3, 6.7.4 and 6.9. (You should be very careful not to confuse target and outcome in this work)



Apply a methodology to
the work place to get

SSM



Conclusion

- You don't need to be a statistics expert to use statistical techniques (you have not been introduced to the mathematical explanations of chi-square)
- But you do need to have an analytical mind if you are to synthesise solutions to strategic business problems
- So, basic statistics can be an SBIT consultant's best friend!

21

3 groups,

or any other element

Show me ~~that~~ that the education is not important

- This variable is sometimes referred to as the control variable because it may reveal how the relationship between the row and column variables changes when you "control" for the effects of the third variable.
- Any significance value below 0.05 is considered significant and not due to chance ('less than 5% chance that the two variables are not related')

13

- If you look at the table of chi-square statistics, you can easily see that in all but one of the education categories, the apparent relationship between income and PDA ownership disappears (typically, a significance value less than 0.05 is considered "significant").

14

- This suggests that the apparent relationship between income and PDA ownership is merely an artefact of the underlying relationship between education level and PDA ownership.
- In other words, the apparent relationship between income and PDA ownership disappears when another variable is used as a 'control' to check whether the relationship is real.

15

- Since income tends to rise as education rises, apparent relationships between income and other variables may actually be the result of differences in education.
- How can the hypothesis that it is the level of education that is strongly related to PDA ownership be tested?

16

So it's plain
that income
is related to
PDA ownership

من فوائد الشراء ← توجد المعلومات الخاصة بكل شخص
وتحليلها وتوجد العلاقات

العمل التي تؤثر على شراء الناس

First steps

- Assume you know nothing about the electronic consumer industry...
- So, you have no hypotheses initially
- But, you do have a grasp of some basic analytical techniques to use on the data
- So, let's look at the data...

- What factors affect the products that people buy? The most obvious is probably how much money people have to spend. In this example, we'll examine the [relationship] between income level and PDA (personal digital assistant) ownership.

(العلاقة بين الدخل ومستوى ملكية PDA)

Analysis types

→ SPSS Data Editor
110 pounds.
Demo

- None of the numbers in this table, however, stand out in any obvious way, indicating any obvious relationship between the variables.
- It is often difficult to analyze a cross-tabulation simply by looking at the simple counts in each cell.

- The fact that there are more than twice as many PDA owners in the \$25,000 - \$49,000 income category than in the under \$25,000 category may not mean much (or anything) since there are also more than twice as many people in that income category.
- We could try to ask for percentages instead of raw counts.

① # Crosstabs

② # Correlations (direction of relation).

what to do (it is only like background/introduction)

6. The project aims to identify key issues in this field, define areas of current and future research into the field, and prescribe solutions to dilemmas and issues arising, suggesting key areas of research and design, and suggestions as to the future. It will aim to call upon the experiences of those in the workplace, those who develop such interfaces, and the contact of those in academic research into the area, as well as existing studies.
7. Organization face to strongest rivals at economy ages that product life cycle is changed extremely fast and lacks a hypothesis into IT infrastructure as handle rapidly changing business model. Finally, organization is inefficient and lacks a knowledge creative a new product and loss a market place.
8. The problem theme is that the low accuracy of inventory records for existing inventory systems because of out-dated information. Example, querying those old PCs owned memory less than 32MB, the "old" system provided wrong information in such case.

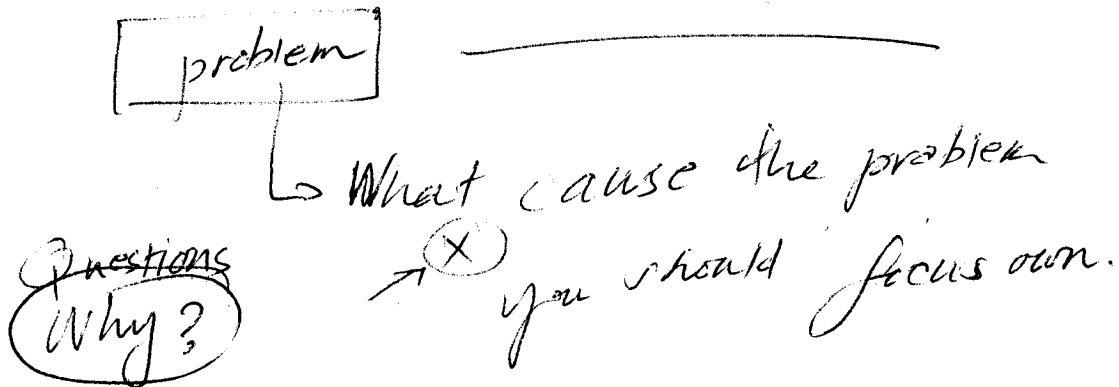
focus the word problem.
Bad English.

confused about his own problem.

Exercise 2

Use the above construction process (CAPE) to define and refine your own research problem.

more than 3 sentences that means he
don't know what he is the problem.



It is an interesting exercise to ask a group of people what, for them, are the connotations of the word "problem". Bryant (1989) suggest the following list as typical:

Problem - a number of alternatives: something that needs solving, something that needs to be changed, something that causes frustration, disagreement over action, a fault has occurred, a barrier to progress etc.

The Mayer definition, simply expressed, means we have some known facts and a desired outcome - in this sense problem solving may be considered as finding an algorithm or transformation (a design) that moves us from one state to the other. In practice, solving real-world problems may be difficult because:

Formulation - the problem definition may be difficult to formulate

Equivalence - The problem definition may be expressible in many equivalent ways

Solutions - A given problem may have one, many or no solutions.

Even if a solution can be found it may be unsatisfactory

We usually have no way of showing that it is correct or even optimal

Sometime we accept a solution because it works, not because we know it to be correct or optimal

Common Faults in Problem Definitions:

Here are the most common faults we see when we look at problem definitions

- Listing many problems,
- Stating the problem as something to do,
- Stating the problem as being something is missing
- Stating a solution not a problem,
- Stating the problem is the problem
- Trivial problems,
- Non strategic business IT problems,
- Not stating a problem at all.

In this list there are three main areas of concern and they are representative of very shallow thinking and I describe them more fully here.

The problem is what I have to do

A large number of students are stating the problem in terms of what they are going to do. This will ALWAYS mean rejection because they do not even know what a problem definition is let alone being to define their own. That is they write something like "my problems is that I have to collect data and draw a conclusion"

The Problem is the Problem

What far too many students write amounts to: my problem is to find an answer to the problem – this of course is obvious but takes us nowhere. Problems are objects not an activities.

For example, stating the problem as "how to ride a bicycle" is incorrect since this is not the problem it's a question about the problem - the problem is "balance when riding a bicycle" and once I know this I can think about defining it in more detail. When you are clear about the problem you can then think about solutions so in this case I might think of several solutions: a training plan, put stabilisers on the bike, use a tandem as practice and so on. In other words a clear problem definition gives you liberty to think about a whole range of possible solutions.

Similarly I see lines like: "My problem is to find the best way to implement Wi-Fi security" - now this is definitely of the form "my problem is to find a way to solve the problem". Clearly here the problem is about "Wi-Fi security" but it's hopeless to think that just saying those words amounts to a definition and what we will be looking for is for it to be defined in some sensible way. Only then can you start looking for ways in which it might be solved. Almost always when we see the above form the student already has a particular solution in mind so the whole outline is just a pretence at going through the motions of setting up a research project but without any notion of what problem is at the heart of this work.

↓ prod of f

↓ A salt ~ DM

↓
DEATHS 2
REWARDS 2
COST 2
↓ prod of The

Policy Model

A policy is an expression of a prudent mechanism for controlling or limiting actions based on an underlying ethic as expressed in the Company/Organisation mission. So for example, in the University we have a policy for assessment and that controls and limits what departments may do. A policy is most often accompanied by a strategy to deal with various aspect of the policy. A good way to think about a policy is to see it as having four elements:

P - Principles that are based on organisational values or on legislative or contractual elements

L - Links to other organisational policies or other documentary sources. If you are not careful here you will find yourself overwriting or changing other policies that already exist in your organisation instead of referring to them.

O - Definitions of the objects to be controlled

T - Track or monitoring elements that set limits on what is permissible. This element will form the bulk of the policy definitions

Therefore the construction process is to set out the principles involved and make sure you are aware of any other related or relevant policies, legislative element or contractual elements. Once the groundwork is done you can set about defining the object to be controlled and lastly set up how they are to be tracked and monitored.

Guidelines

These are just advice notes. These are used instead of policies where it is not possible or desirable to absolutely control some activity or activities but we want to encourage some limitations.

Deliberative

The functional means by which values, issues, strengths and aims are debated to formulate a policy or strategy

Executive

The person responsible for ensuring that actions are taken and their outcomes monitored

Strategic Plans

Strategic plans are action specified at a high (relatively) level of resolution – that is they say what actions are needed and not necessarily how those actions are achieved in practice. It is helpful to think how a strategic plan is constructed as based on one or more of the following items although implicitly all of them are always involved.

V - Build your plan on a set of values that you set your organisation

I - Build your plan by looking at issues (needs if you like)

S - Build your plan by looking at your strengths – concentrate on what you do well

A - Build your plan based on aims that you have set

The process whereby one develops a strategy is very simple. All one does is take lets say an issue (problem) and by a process of deduction arrive at an activity or perhaps a set of activities that acting together will remove the problem. To be practical on needs to not just state the action but describe it and monitor it. The strategic plan then just essentially lists the actions needed and how they will be monitored in some sensible structured manner. Often organisations have set guidelines on how plans are to be set out and when that exists one must follow them.

Ethical Viewpoint

The basis of the ethical viewpoint is that the University is always seeking to achieve the highest standards in every respect related to its mission and to enhance and maintain that position. Briefly:

The requirement is for excellence with a distinct character related to a given organisation.

The standards relating to contractual, academic, financial and ethical considerations must be applied impartially everywhere and be of such a probity that they can be defended anywhere.

Actions

Actions are implicit in many of the things we write about. However, they are always expressed to a certain degree of resolution. This implies that an action in a strategic plan at University level of resolution translates into several actions at departmental level of resolution.

Action Plans

These are detailed plans for implementing a strategy

Best Practice

Many processes and procedures will be present in the system and all we do is identify and define them unambiguously. It follows that to develop best practice one has to define what practices are available. Now in all likelihood there will be several ways of doing almost anything and so if one wants to progress it is necessary to identify the best of these practices and use that as the standard until something better comes along. In simple terms: identify practices; decide which ones are good practices and eventually which one might be classified as best practice. Best practice is likely to be a matter of expert professional judgment but can be identified by the following elements:

- Generates a well-defined outcome (not outcomes).
- Is often recognised as plain common sense.
- Fits in well with existing procedures and processes.
- Cost effective.
- Efficient.
- Can be learned and in that sense described in a document

Code of Practice

These are guidance notes that set out what has been generally recognised as best practice for a whole industry.

What are Quality Standards

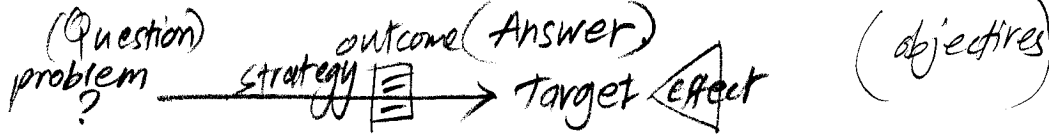
There are several ways it is possible to define procedures depending on our particular view of what is meant by quality. However, a good working definition is as follows:

Quality standards define, at an appropriate level of resolution, the procedure or procedures necessary to guarantee a desired outcome.

Standards are not to be seen as a lowest common denominator upon which everyone can agree. Standards produced in this way are almost always unhelpful.

Standards are not fixed for all time and one would expect that they would evolve as more and more domain specific knowledge is gained.

Standards are not primarily a mechanism for punishing those who fail to achieve quality improvements



Exercise 001b.01.a – Target and Outcome

Target – the real-world effect that you want to produce. Usually targets are introduced by a verb: improved network infrastructure, strategic Technology alignment, reduce network down time, a heightened awareness of security etc.

Outcome – this is what you produce as part of your project, dissertation or thesis. As we have seen the idea is that we can use this outcome to generate the target effects. Outcomes are objects and so tend to be stated as nouns: a model, an explanation of some behavior, a usage protocol, a feasibility report, a post implementation review etc

Features of an outcome – it can be written down, it easily observable, it can be placed in a document, it can be sent to Portsmouth for marking. If it is any or all of these it's probably an outcome.

Exercise 1

In the following table look at the named object and the try to decide whether it is likely to be regarded as a target (T) or and outcome (O) for your MSc project and then add a little note of explanation.

is it effect? (The effect) Target / outcome [Hard Copy]

	Project Object	T	O	Rationale
1	A strategy		X	It can be written down and sent to Portsmouth
2	Increased productivity	X		Not easily observable but is clearly an effect
3	Better fit with technology	X		Not easily observable but is clearly an effects
4	A best Practice Model		X	It can be constructed and documented and sent to Portsmouth
5	Improved sales	X		An effect but it cannot be sent to Portsmouth for marking
6	A security policy		X	It can be written down and sent to Portsmouth
7	Highly usable systems	X		Not easily observable and cannot be sent to Portsmouth
8	Efficient network control	X		Not easily observable and cannot be sent to Portsmouth
9	A pattern of work		X	It can be described and sent to Portsmouth
10	A process flow		X	It can be described and sent to Portsmouth
11	Simpler Web Page Access	X		An effect but cannot really be sent to Portsmouth
12	A role description		X	It can be written down and sent to Portsmouth
13	Better trained operators	X		Not easily observable and cannot be sent to Portsmouth
14	A list of functions		X	They can be written down and sent to Portsmouth
15	A theory		X	It can be written down and sent to Portsmouth
16	A feasibility report		X	It can be written down and sent to Portsmouth
17	A computerised sales program		X	It can be constructed and see in action and sent to Portsmouth
18	Improved Management Competence	X		Observable effect but it cannot be sent to Portsmouth
19	A predicative report		X	It can be written down and sent to Portsmouth
20	A process description		X	It can be written down and sent to Portsmouth
21	A model or framework description		X	It can be written down and sent to Portsmouth
22	Improved IT management	X		Not easily observable and cannot be sent to Portsmouth
23	A definition or set of definitions		X	They can be written down and sent to Portsmouth
24	A comparison matrix		X	It can be constructed and sent to Portsmouth
25	A design catalogue		X	It can be written down and sent to Portsmouth
26	Reduced number of security violations	X		Not easily observable and cannot be sent to Portsmouth
27	A security protocol		X	It can be written down and sent to Portsmouth
28	More secure passwords	X		Not easily observable and cannot be sent to Portsmouth
29	System Requirements		x	These can obviously be written down
29	Elevated Business Focus	X		Sound like a good business idea but cannot be sent to Portsmouth

Exercise 2

For the ones you marked as probable targets in exercise one, write down a possible MSc project outcome forms that might reasonably be thought of as generating or going some way to generating that intended target. (Do not assume that because there are 15 spaces there are that many targets in the above)

My answers are just suggestions as to choices of something that could reasonably be expected to get us to the target. It is very unlikely that you have the same ideas but be guided by what I have written as to the suitability of your own answer.

	Project Target Name	Possible outcomes for those that are targets
1	Increased productivity	A report outlining a new training model
2	Better fit with technology	A report which reviews current technology and its impact on productivity
3	Improved sales	A strategy document on better use of email
4	Highly usable systems	An feasibility report looking at a new IT interface arrangement
5	Efficient network control	A portfolio of network best practice management scenarios
6	Simpler Web Page Access	A set of program outlines
7	Better trained operators	A training plan
8	Improved Management Competence	A framework (model if you like) of required competences
9	Improved IT management	A required skills assessment
10	Reduced number of security violations	A computer usage policy
11	More secure passwords	A procedure for testing passwords for strength
12	Elevated Business Focus	A recommendation to implement say outsourcing
13		
14		
15		

Ideas 003a.01 – Qualitative Data Processing Mechanisms

Many projects in technology deal with qualitative data and this note just outlines the sort of things you can do at the pre-processing stage in your research design.

Introduction

It is very important to keep notes of interviews, observations or notes as you read through documents and make sure they are structured and accurate otherwise you will find your biases coming out in the results – that is you will interpret what you find the way you would like them to be.

As you know there are two phases of processing in research. The first one is all about assembling your primary data collection and the second phase is to process the collection into the intended outcome. Don't fall into the trap, as many students do, of collecting that data and then ignoring it as far as getting an outcome is concerned and that can only have one result – fail.

PLEASE remember the processing activities suggested here are not designed to generate a project outcome - these are really pre-processing stages to analyse the data ready for you to construct your project outcome. So be WARNED - if all you do for example is apply several of these activities to your data then normally that will NOT be regarded as generating your project outcome.

So for example suppose I have a set of interview transcripts and a set of observation notes all collected in an attempt let's say to generate as my project outcome - a best practice portfolio on internal software application development. So I might for example process this data (transcripts and observation notes) to get: common threads, outliers and labelling but obviously those three lists cannot possibly be regarded as my best practice portfolio but they are a necessary step toward me generating it.

Processing Ideas

These are the most common ideas that one typically uses to look at qualitative data. I am not suggesting you use all of them but usually as the data emerges from your collection process you will start to get a feel for which ones might be the most useful.

Commonly, people use a spreadsheet, Word or Database to deal with all this although it can also be done by hand. My preferences would always be a database because of the potential for indexing, searching or linking it to other data sets or even links within itself.

Common Threads - Are there common response threads running through your interviews, observations or documents as these indicate a shared understanding in your sample and might be useful in formulating the project outcome.

Usual process - use a tabular method to collect this evidence together by listing the themes and counting occurrences and variations.

Outliers - It is often useful to look for extreme or unusual opinion or events and they might point to serious problems in the situation you are investigating. These indicate that the understanding is not shared and often mean that further investigation and may lead to very useful insights.

Usual process – use the same tabular record used for common threads but look for item on it where the opinion is in different, unusual or extreme with very little agreement with any other sources with virtually no commonality.

Word Frequency - You can construct a concordance and look at how frequently words are used and of course it also gives you the situation vocabulary.

Usual Process – use a software tool to generate the list of all words used and their frequencies. In fact it may be quite interesting to see how wide the vocabulary is as this might give you another “handle” on the problem theme. I would not recommend you try to do this manually unless the transcript or documents are of a very limited nature. Unfortunately, if the documents are not in an electronic form (unusual these days) then a manual process is the only one possible.

Meaning - Make sure you know the meaning of any words used and what kinds of words are used: descriptive, explanatory, critical and so on

Usual Process – using a constructed concordance or glossary to list out all the words used and then for the important ones or ones where you do not understand the meaning write a definition.

Semantics – this is just an extension of “meaning” but here you are trying to ensure that you understand what has been said – so one might look at phrases or sentences for example. This needs a lot of care because it is all too easy to see a meaning that you would like to see and not the one that is actually part of the data. It is unfortunately all too common for students to write what they think is a simplification in their own words or substitute an accepted situation word or words for one of their own and this can often turn out to be disastrous.

Usual Process – it is hard to find an absolutely secure process here because a certain amount of domain expertise is always needed. However, a reasonable plan is to look for and write down the key ideas in the phrase or sentence because if you have the key idea then in practice one understands what is being said. One almost always does this in conjunction with the tabulated themes because themes themselves might be an object, an activity or an idea.

Labelling - It is often interesting to look at how situation elements are labelled. For example, the software might be labelled as ‘useless’ or ‘difficult’ by users or the managers labelled as ‘arrogant’, ‘unhelpful’ or ‘lazy’. When this happens it may indicate serious problems in the situation.

Usual Process – using a constructed concordance or glossary to list out all the words used and then for what you regard as a label search for them in the list.

Structures - You can partition the answers into such things as: opinions, definition, explanation, theories, concepts, methods, policies, governance, training, environment, attitudes and so on or any other categorisation that you can identify. This will help to ensure that you have a good understanding of the situation as seen from interviews or documents.

Usual Process – use your tabulated list of themes and then add extra columns to code the structure that you have identified or want to use. Remember that an element may have more than one structure – something could be a definition but also be expressed in the form of an opinion.

Response Validity - Always ask is the response valid or relevant in that situation or can it be discarded. The reason you want to do it is because you don’t want to be encumbered by data that has no value and one is always looking to get the smallest valid data set.

Usual Process – this is not easy to do and it requires good to very good domain knowledge. I would recommend you try to generate a few simple questions that you apply to the data and if they all give a yes answer then accept the data. This might be things like: “is it a common opinion”, “is it a fact”, “is it interesting or insightful” that sort of thing but don’t have too many questions else you will end up with no valid data!

Response Reliability - Always ask how reliable is the data that you find or are given - this is to do with how the interview or search was carried out and can you rely on it as being truthful.

Usual Process - Essentially we ask would we get the same result if we did the interview/search again.

Significance - Can you identify items that are clearly significant in this situation – significance here means that the response is representative of something genuine.

Usual Process – just look at the tabulated frequencies for the main themes, labels and significant words used. One cannot be certain from just frequency that it is significant so one must also weight it up in your mind against your research question and whether you can do something with the data. For example, to be flippant one might get a common theme emerging that there is not enough car park space and things like that it is almost certain you can do nothing about.

Generalise - Is there anything that leads you to make generalisations.

Usual Process – essentially what one does is look at themes, labels, outliers and knowing these have emerged from a sample we now try say what it might mean for the whole company - can it apply to the whole company, is there some important element in this theme that has a much wider implications, is there a principles that can be established, can I construct a theory and so on.

Try to remember that you may need to do all the above for each different group that you interview or documents that you look at or situations that you observe, as there may be differences or links between the groups which you want to identify.

Read Saunders chapter 9 starting at page 245. Pay particular attention to quality issues on page 253 and the themes idea on page 255. Finally be sure you or anyone you employ is competent to carry out the interviews, document searches and so on - so read pages 262-264.

1 - Contextualisation and Selecting a Research Method

Problem - just remind yourself of the single problem theme that this research was trying to resolve

Target - just remind yourself of the principle target of this research and recall that targets are effects that we want to generate by using our outcome that when used will create effects that amount to a solution to the problem stated. Do not fall into the trap of naming an object instead of an effect or stating the location of the effect and not the effect itself. So it would be quite wrong to say my target is a "new software model" as that is an object and what we want here is the effects created in the real world of using that model. Similarly, don't say "my target is the help desk staff" because that points to a location not an effect on the help desk staff or what they might do.

Outcome - This MUST be the same as you stated in the relevant section and in the aim. Possible and common outcomes are expressed as: reports, position papers, models, frameworks, catalogues, best practice descriptions, process portfolios, policies, strategies, reviews, requirements documents, process descriptions, role profiles, factor or task illustrations, people or situation portraits, critiques and so on but its key characteristic is that it is typically a document of some kind and may be expressed as text or diagrams or a mixture of both.

Research Question - just recall to mind this element because it summarises what your whole project is about. It has 5 elements which may be stated as **SPITS** - Spotlight (data), Problem, Interrogative, Target and Suggestion though not necessarily written out in that order.

Research Method - Here one requires a rational choice of method based on a consideration of the data, the situation and the typical criteria applied to the method. Possibilities are: case studies, surveys, experiments, grounded theory, action research, requirements gathering, histories, vignettes, quasi-experiments, biographies, histories etc. Make sure you look at the criteria usually associated with each of these research models - don't assume you know and don't try as a rational justification a quotation from a book as these can only be generalisations.

2 - Defining and Collecting the Data

BAGeD - This is the KEY part of the thought process of defining the primary data; you try to put a sharp spotlight on just the primary data that you need - perhaps the best way is to think as clearly as you can when deciding on the activity that it points to what you must write down as data. Here are some common words to help you think about your basic activity: account for, analyse, appraise, assess, catalogue, collect, compare, contrast, criticise, define, describe, differentiate, discuss, evaluate, examine, explain, explore, illustrate, interpret, justify, link, outline, portray, profile, represent, summarise, synthesise and so on. Make sure you KNOW what these words means don't just arrogantly assume you know - this list is to help you think and it's not to be used to just pick anything that sounds as if it might be right.

Primary Data Items - This is where you try to say what exactly you are looking for as data items. This will normally require very careful thinking if you are to arrive at something sensible, identifiable, worthwhile and collectable.

Location - Here you must state where the data is located and sensibly and practically consider if you can get access to it. Try to be practical as far too often we see impossible plans for example wanting to interview 50 management directors or trying to use observation for getting data from an ATM.

Sample size - This will vary considerable depending on the research method you choose. In most case it is only totally applicable when there is a survey and there is a table in the set book on how to calculate a sample size. In all other case it's a matter of working out what you can do in the time available to you

Collection Protocol - The data has to be physically collected and here you must be precise as to how that can be done based on the data itself and on a consideration of it location. The most common mechanisms employed are: interview, questionnaire, observation, role playing, seminar, focus groups and document searching.

Selection protocol - You must know exactly who or where you will get data from. The exact description will depend on the Research Method chosen coupled with a consideration of the collection protocol. So if we were using a survey we need a precise definition to say how we pick our sample points and what data we collect from them.

Recording Method - All data has to be recorded so one needs to plan how that will be done. Possibilities are: note taking, reports/transcripts, form filling, audio recording, video recording, computer logging or searching, excerpts from documents and so on.

Presentation of Raw Primary Data - All you data has to be available for inspection and so you have to provide it to your project readers in some form. Most often it is in a tabular or catalogue summarised form and placed in the project appendix.

3 – Generating the Intended outcome from the Structured Collection of Primary Data

Pre-processing - The primary data as collected is not always suitable for use in the final phase of generating the project outcome so at this stage one must pre-process it to get a structured collection of some kind. For example, if ones raw primary data was in the form of interview summarised transcripts then one would go through each transcript categorising that data found there into say a table of some kind using normal text processing ideas. Similarly, if one has a series of vignettes one would create a concise and lucid illustration from each one. If it was a set of questionnaires one might decide to structure it into a series of charts and from those charts one could generate the project outcome.

You have to try to say how this processing is done. It will NOT be sufficient to say something like "I will look through the data and form a catalogue" or something equally vague. Try to be as precise as you can without being excruciatingly pedantic. Commonly students think of things such as categorising the data into subgroups or factors, simply setting a priority on items in a list in some way, using a well defined procedure to transform the items, using some form of matching or linking process or using a model or framework of some kind to transform the basic data into something more useful.

It is also quite common to use secondary data or the literature to help with this stage, for example there might be a company wide procedure for say prioritising tasks or there might be a standard list of variables that can be used to match common factors in interview transcripts.

Form of structured Primary Data Collection – this section goes with the pre-processing and it simply means you try to decide by looking at your outcome what would be the best form in which to present your structured collection of primary data. The most common forms are: a series of charts or tables, a catalogue of some kind, a set of illustrations, a list and description, a prioritised list and description, a matrix arrangement of some kind with statistics, a matching list and so on.

Outcome processing – this is the last stage of processing and here one takes the structured collection and from it generates the intended outcome. Again you must define HOW this will be done. It will in no way be sufficient to say things like "I will examine the data and draw conclusions" or "after careful analysis of the data I will generate my policy" – if you do that your work will register as a fail because by saying making such vague statements you are telling the world that you have no idea what to do with the data and only just managing to tell the world that you know something has to be done with it.

The methods you use here may be quite similar to what you do in pre-processing but typically at this stage one tends to rely on models of some kind. You should note that in pre-processing we are largely just re-presenting the same data in a more useful form. But in outcome processing we are typically trying to generate a single object of some kind such as those listed in section 1 above but I copy them here for convenience: reports, position papers, models, frameworks, catalogues, best practice descriptions, policies, strategies, reviews, requirements documents, process descriptions, role profiles, factor or task illustrations, people or situation portraits, critiques and so on but its key characteristic is that it is typically a document of some kind and may be text or diagrams or a mixture of both.

Example Part 1 – Contextualisation and Selecting a Research Method (extracted from student work)

Problem – Post Merger Integration is crucial success element in any given merger because it enables common business processes and economies of scale. IT underpins most critical business processes and the system integration process and infrastructures will accelerate or delay the overall business merger.

Target - A reduction in the timescale needed to integrate IT in a post-merger environment, allowing a company to achieve cost and efficiency benefits soonest.

Outcome - A documented standard model for the planning and implementation of a merger based IT integration process.

Research Question – How (interrogative) can IT performance of disparate systems (problem) be enhanced to accelerate the process of post merger integration (target) by examining the system integration process (spotlight) in order to define an IT integration model for planning and implementation. (Suggestion).

Please be aware that it is not necessary or particularly describable that in your final work you add in the SPITS words – they are here for illustrative purposes only but if it helps you at the early stage that is fine

Research Method - The data that is the basis for this research has recently become accessible as well as the individuals who were involved in the PMI (post merger integration) of IT. To fully understand the actions and activities in post-merger IT integration events one must appreciate both the immediate context and longer term implication. This can be done by critically reflecting on situations that have occurred as a kind of model leading to greater insight into the problem area. It therefore seems worthwhile in this case to use the Biographies/Histories research method to best trace the progress of some sample completed merger integrations and by a process of evaluation and understanding of the decisions taken and activities that occurred, as well as to solicit feedback.

Example Part 2 – Defining and Collecting the Data

BAGeD - The key activity here is to identify and explore IT integration activities performed and decisions made by individuals and groups in a pre-merger situation and post-merger reviews.

Primary Data Items – The significant activity/decision data made at the pre-merger stage needed to generate the stated outcome would fall within broad areas (in the context of PMI) such as: pre-merger assessments and information gathering, planning, implementation and reviewing and would include instances of decisions and resource allocation affecting project flow.

The significant activities/decisions data made at the post merger IT integration with consist of an impact assessment using the broad areas of pre-merger assessment, information gathering, planning, implementation and review. There will be a specific focus on the use of: planning tools, data collection protocols, allocation of resources, deliverables, decision making constraints, in house skills, etc).

Location - The primary source of the historical data would be employees of ABC Media and any documents produced as part of the IT integration process. Employees that were involved in planning, directing or deemed as having significant influence on the process will initially be identified via the Technology Director leading the IT integration and the Operations Director, who were leading the business integration and then via contact with the individuals identified and any additional locations as recommended by them.

Sample size – not applicable in this case

Collection Protocol - To fully explore the decision making process and explain actions there will need to be interactive elements to primary data collection. Therefore a mixture of semi-structured and in-depth interviews coupled with document analysis.

Selection protocol - The criteria for the sample of interviews will be Directors, IT Dept managers and defined Technical Leads who were directly involved in the IT integration and a selection of Business managers because their system requirements were obviously influential.

Recording Method – Written notes/transcripts will be taken during the interview and where possible audio recordings will be used. These will all be support by document extracts.

Presentation of Raw Primary Data – The primary data will essentially be presented as interview transcripts, selected integration documents and illustrations of the various activities/decisions and will be available in the appendix of the project.

Example Part 3 – Generating the Intended outcome from the Structured Collection of Primary Data

Pre-processing – In order to structure the data the transcripts, documents extracts and illustrations will be processed to establish a base cluster of activities, pivotal events, dependencies, interactions and the performance and criticality of these items. These groups will largely be identified by the managers involved in the work but additionally the will be a layer of analysis that searches for:

Identification of common themes in situations, activities, decisions or influences.

Comments or descriptions of events that could be viewed as unusual, extreme or attaching positive or negative labels.

Frequency of words used (focusing on planning or activity based e.g. "Requirements" or "Testing", but not limited to these), indicating either the commonality of an issue or its significance.

Form of structured Primary Data Collection – the structured primary data will be presented as a process/decision catalogue which might also include charts and diagrams.

Outcome processing – Here I am looking to eventually produce a model for the IT planning and integration process so I will use the usual model idea of linking activities and processes. Using the catalogue produced in the pre-processing stage and thinking of the interaction practice as a flow of events it may be beneficial to treat it as a form of system driving towards the goal of integration.

Given this, the data may best be interpreted with the aid of tools from Soft Systems Methodology starting with a Rich Pictures to aid with understanding, interpretation and the sharing of perceptions on of specific events. From this we may use the basic SSM tools of Relevant Systems and Root Definitions and hence move to the conceptual modelling stage and thus after processing through an SSM agenda a proposed model for the technology integration process will be developed and presented.

Preparation Blank 1 – Contextualisation and Selecting a Research Method

Problem –

Target –

Outcome –

Research Question –

Research Method –

Preparation Blank 2 – Defining and Collecting the Data

BAGeD –

Primary Data Items –

Location –

Sample size –

Collection Protocol –

Selection protocol –

Recording Method –

Presentation of Raw Primary Data –

Preparation Blank 3 – Generating the Intended outcome from the Structured Collection of Primary Data

Pre-processing -

Form of structured Primary Data Collection –

Outcome processing –

Exercise 004b.01a – Finding a Basic Activity Word Spotlight

Exercise 1 - Write some notes to explain to fellow students what the following verbs might mean in practice.

Account for	Explain and clarify something by giving reasons
Analyse	Resolve something into its component part, or examine critically and minutely.
Appraise	This is best thought of as something like forming an opinion about something. It might be quite simple such as forming an opinion as to whether something is good or bad but more often that not it's about forming an opinion about something after assessment or evaluation with regard to what can be done - so we might appraise whether a process for example should be left unchanged, modified or made redundant
Assess	Determine the value of something. Similar to evaluation but it is often useful to think of evaluation as a qualitative process and assessment as a quantitative one.
Catalogue	This means to create an order collection of some sort where there is a logical order and the essence of the task is to enumerate and describe
Collect	This is very simple as all one does is to identify the data and literally collect it as you see it. So if I were looking for SPAM instances then as soon as I find one I just file the whole SPAM email away for later processing.
Compare	Look for similarities between one or more things.
Contrast	Look for differences between one or more things.
Criticise	Make a judgement, backed by a discussion of the evidence or reasoning involved, about the merits of theories, opinions, plans and so on.
Define	State the exact meaning you are attaching to a word, phrase, idea, process etc
Describe	This may be used freely to describe in detail situations, events, opinions, feelings and so on.
Differentiate	Look for differences between things
Discuss	Explain something by given two sides of the argument
Evaluate	In some cases one might want to look at events or people or processes in order to form an evaluation and that collection of (usually) small evaluations form our primary data.
Examine	Look carefully at the details of an argument, theory, or plan etc
Explain	Explain - this is about saying why something is. So one can describe an event but also explain why it occurred

Explore	You can use this word but we are always exploring so it must be used with care. Typically, in these case one starts with a model of some kind and uses that to inform the exploration process. For example, we might have a theoretical process map and we use it to explore various working processes to see if we can find flaws or weaknesses and then those descriptions of flaws or weaknesses become out primary data.
Illustrate	Here one is trying to find a way to expresses in a very pointed way some situation or thing. So one might identify an instance of SPAM and then illustrate why it might be harmful and so that adds poignancy to the example you have extracted. Mostly, it is best to think of illustration as a way of giving an example but in that example you want to make just one clear point.
Interpret	The essence here is that one is typically observing something to describe it but also to find some meaning in what is being done. This is often used when looking at social groups or situations where it is not always obvious why certain actions occur
Justify	Show adequate grounds for decisions and conclusions and answer the main objections likely to be made about them.
Link	This is often a neat way of dealing with some types of data where you think there is a relation but the relation itself is not known with any certainty. On often find this kind of activity evidences in a matrix formulation or representation.
Outline	Give the main feature or principles of a object, omitting minor details and emphasising structure and arrangement
Portray	This might be a useful verb if you were looking for types in a study. For example, if you were looking for people who get involved in illegal downloads one might want to portray them in some way.
Profile	This is similar to a description but it focuses on just the key points. For example, if we were looking for best practice in a situation then we might start by just profiling a given task – that is we outline the main steps and rational to start with. The idea is similar to an outline but implies deliberate section of certain aspects.
Represent	Sometimes you might plan to build a representation of some event as you primary data. For instance, if one was looking for security awareness in employees then of course one cannot "see" it or collect it as such. In these cases we must try to find a way of representing an awareness level or feeling and that representation forms our data.
Summarise	Give a concise and lucid explanation or account of something, presenting the chief factors and omitting minor details and examples
Synthesise	Resolve something into a whole from its component part.

Exercise 2

Suppose that my BAGeD was to LINK (my basic activity) a security violation with a particular user behaviour - that will generate a primary data item (implicit here is that we also need a description of each violation and user behaviour). Use this basis idea and write a complete data collection phase from it.

Data Collection Process

In this case I am combining my BAGeD with a pre-processing stage to get my useful primary data collection.

When complete I will have a collection (perhaps 1000s) of pairs of values (violation and user behaviours) and now I must process the whole collection to get my intended project outcome.

Let us suppose that my intended outcome is to producer a company wide policy on framework for use by IT implementations. To do this I must have a process so I start by forming a matrix of violation linked to a user behaviour and in a second pre-processing stage I prioritise the list by violation severity. Here you must realise that I have to know how to describe the severity of a violation, I cannot just make it up. Let us suppose I do it by looking at extent – that is I ask what is the extent of the violation: local to the PC, local to a particular system, local to the intranet or global to the company.

In my last step I need no to use the prioritised matrix to develop a security policy. Therefore I might search for an appropriate BS to guide me in the process or I might use a method called PLOT – but whatever I use it has to be such that it can be repeated by another person. The whole purpose of the process is that I can then draw up a policy that might eliminate these inappropriate user behaviours.

MSc Degree Structure

Research Methods – 12 weeks or 150 hours study for 15 credits

Research Ideas and principles

Statistics

Project – at least 18 weeks or 450 hours for 45 credits (about 15,000 words)

A research project of your own choice but University Approved

Project must have a strategic business IT outcome

Project must involve significant IT learning

1

Work Schedule – Research Methods

Research Methods Steps (parts of the assessment package)

Assessment 1a Part 1 – get approval for a project idea

Assessment 1a Part 2 – online tests

Assessment 1a Part 3 – Literature Review & Project Specification

Assessment 2 – Statistics

Supervisor appointed and Research Project starts

2

Student Progress Marks and Warnings

During Research Method unit progress marks are awarded

One attempt at each of 5 online test to gain a maximum of 5 marks

One attempt to gain project approval for a maximum of 10 marks

Deadlines – failure to meet due dates will normally mean unit failure

Assessment Instructions – failure to follow instructions means failure

English – if your language is judged poor then project cannot start

3

Project Styles

Engineering - where you build something such as a web site, invoicing system, requirements document etc

Study - where you look at a problem related to a topic area such as might occur in the use of say IT collaboration Tools

Review - where you review a topic of current interest by looking only at primary sources: journals or reports. This style will ONLY be allowed in exceptional cases where the topic is based on a new technical idea and the student can get access to journals and reports.

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Degree and Project Style

Engineering Style Project

MSc Internet Systems Design

MSc eCommerce and Marketing

Study and Review Style Projects

MSc eCommerce and Marketing

MSc Marketing and eCommerce

MSc Strategic Business IT

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Summary of what we will do

Define – Problem and associated target

Research Question – at a minimum linking problem and target

Outcome – the object to be generated: model, report, theory, a matrix,...

Aim – to link outcome and target

Objectives – a set of activities that generate minor project outcomes

Research Design Part 1 – define the data and state how it is to be collected

Research Design Part 2 – process the collected primary data to get the outcome

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Basic Research Structure

Topic Area – this just define the general area in which you are working This is a simple step and although part of the process is not a key elements in focusing

Problem – define a single significant problem

Target – say what real-world effects will be produced if we can solve the problem

Research Question – a lucid question that links problem, target, outcome and data

Outcome – what is it that you can produce that will generate the target effects

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Cyclic Research Structure

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graph TD
    Problem --> Target
    Target --> Speculation
    Speculation --> Outcome
    Outcome --> Problem
  
```

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Key Research Process

Suppose your problem is lack of sales staff productivity

Then my target might be higher sales revenue

So I speculate that this low productivity might be due to lack of training, poor customer records, poor IT infrastructure, inefficient email, etc. But I decide email is a major cause of this problem

Next I collect data on email usage practices amongst sales staff

I process the data to produce my project outcome – a report that defines a set of Best Practice Strategies for email management

I generate this Best Practice Strategy outcome because I believe it will help resolve the email problem and hence I get to my target.

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An Important Distinction

Problem - is something that is a matter of concern or debate in a given situation

Target – this is the real-world effect that you want to produce. It might be things like: improved network infrastructure, strategic Technology alignment, reduce network down time, a heightened awareness of security etc. (VERBS)

Outcome – this is what you produce as part of your project, dissertation or thesis. As we have seen the idea is that we can use this outcome to generate the target effects. Possible outcomes are: a model, an explanation of some behavior, a usage protocol, a feasibility report, a post implementation review etc (Nouns)

Features of an outcome - when you name your outcome ask: can I write it down, is it easily observable, can it be placed in a document, can it be sent to Portsmouth for marking. If it is any or all of these its probably an outcome

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Can you make the Distinction

1. A strategy	15. A theory
2. Increased productivity	16. A feasibility report
3. Better fit with technology	17. A computerised sales program
4. A best Practice Model	18. A post implementation review
5. Improved sales	19. A predicative report
6. A security policy	20. A process description
7. Highly usable systems	21. A model or framework description
8. Efficient network control	22. Improve IT management
9. A pattern of work	23. A definition or set of definitions
10. A process flow	24. A comparison matrix
11. Simpler Web Page Access	25. A design
12. A role description	26. A methodology
13. Better trained operators	27. A security protocol
14. A list	28. Secure passwords

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Projects must be Research Based


Research Based means you attempt to resolve a problem

Research Based means there will be a real-world effect if the problem can be solved and this effect is known as the target

Research Based means you have an idea as to what form a solution to the problem may take

Research Based means you define and collect original (primary) data that can be used to generate a form of solution to the problem

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Primary Data

Primary Data - data that will not EXIST as a collection until YOU define and collect it for some purpose.


Primary Sources – the first recorded case of existing information contained in journals, reports, theses and some books.

Engineering Style: Primary data as the discovered requirements

Study Style: Primary data is as you define it and collect it, in for example in survey, document search, interview and so on

Review Style: Primary sources only

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Primary Data Examples

Example 1. If I extract instances of phishing (problem) from an email log (secondary data) would that list of phishing instances be primary data?

Answer 1. It would be primary data even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data collection) did not.


Example 2. If I conduct interviews in order to discover a user purpose regarding illegal downloads (problem) would my transcripts be primary data?

Answer 2. It would be primary data since interview transcripts did not exist before the interviews took place.

Example 3. If I read reports (secondary data) on security violations (problem) for a company with a view to identifying the root cause of each violation

Answer 3. even though the violation reports exist (secondary data) the list of root causes (my primary data) did not.






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Research Question

This is a way of capturing problem, target, data and a suggested outcome into one lucid and concise question that will form the focus of your research

Structure – it has typically 5 elements that you might use but do not worry too much about the order in which you present them although it would be odd not to have the interrogative at the beginning. (SPITS for short)

-  **Spotlight** – what sort area will the data come from?
-  **Problem** – this is about focusing on the problem itself
-  **Interrogative** – what is question key (how, why, what etc)
-  **Target** – what sort of real world effect is being sought
-  **Suggestion** – what sort of outcome are we looking for

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RQ Answer Forms

Interrogative words - Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.


Question that use: does, is, are, what, when or can will expect as an answer a fixed list of possibilities: yes/no or low, medium, high, etc

Question that use: how, why, who or where will expect as an answer an explanation in the form of a: report, model, equation, theory, design, evaluation etc

Question that use: how, who or what will expect as an answer an exploration in the form of a: list, explanation, comparison matrix, pattern, survey report, a theory etc

Question that use: how, who or why will expect as an answer a description in the form of a: report, process or procedure, model, policy, strategy, theory etc


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Research Question Example

How (interrogative) can the billing cycle (problem) be improved by identifying and defining a best practice portfolio (suggested outcome) in order to improve the quality of response (target) to customers by reviewing the initial accounting processes stages (data spotlight)?"

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Common RQ Errors

Error Type 1: Not a Question - to an English speaker the following would not sound like a question, it would sound like a heading to a list of instructions or a procedure.

How to make business applications development productive at XYZ Corporation?

Error Type 2: Multiple Questions – It is not a good idea to try to put TWO (or more) questions into one as follows – (testing and bugs).

How can software bugs be minimised and the testing shortened in the development process of an Inventory Management system.

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Common RQ Errors

Error Type 3 - Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example, it is easy to see that the answer is bound to be YES - of course a better work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this.

How can a business application development process increase the productivity at XYZ?" or

Can a better work-life balance be achieved with telecommuting for technical personnel?"

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Common RQ Errors

Error Type 4: The question is a solution – in this class of error the question is worded in such a way that it is in fact a solution. The trouble with doing this is that it cuts off any further speculation about dealing with this problem idea and so the question becomes rather pointless.

What strategic business indicators are available to drive the process of building a secure network infrastructure in order to ensure continuous business operations.

Here it looks as if the problem is "building secure network infrastructure" and what we want as a target is "continuous business operations". But in effect we are told to look for "strategic indicators" as a solution to this problem theme.

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Project Research

Phase 1 – define and collect primary data

If I extract instances of phishing (problem) from an email log that would be primary data because even though the email log is secondary data, the list of phishing instances (my primary data collection) as a collection does not.

Phase 2 – process primary data collection to get an outcome

My purpose being to process this primary data collection to find out the most common sources of phishing and express my findings in an evaluatory report which outlines a management strategy (my form of answer).

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Example – Study Project Set Up

Problem Theme: illegal downloads using up resources and increasing security risk

Target: improved worker productivity, efficient use of bandwidth and reduced infection risk

Speculation – here I might say the causes are to do with poor training, poor security, user ignorance of the dangers, no policy etc. But I settle on the lack of a policy.

Research Question: How can (interrogative) illegal download (problem) be prevented or reduced in order to improved worker productivity, gain an efficient use of bandwidth and a reduced infection risk (target) by an analysis of computer user Behaviors (data spotlight) by generating a security policy (suggestion).

With "How" we might expect an explanation answer and in this case it is expressed as a policy document because that limits and controls download behaviours.

Project Outcome: a security policy aimed at this activity because I think that it will generate the targets stated above.

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The Research Process – an Analogy

Phase 1 is like working with a shopping list to collect a bag of ingredients (collection of the primary data) and phase 2 is like using a recipe for Combining them to make a cake (your intended outcome).

To reverse the analogy, if you were going to make a cake you would not just walk into a shop, just pick up a random set of ingredients and then mix them all together into some muddle and expect a cake to emerge - no one but an idiot would do that would they?

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Research Methods

In research, usually we try to do one or more of the following: understand something, explore something, describe something, explain something, improve something, build something or prove something.

A Research Method is a model a framework in which you set your research design – this useful because each model will have features that suit what it is you are doing

Common Research Methods	Common Research Methods
Case Studies Vignettes Action Research Experiments Quasi-Experiments	Surveys Biographies/History Grounded Theory Ethnography Requirements Gathering

Research Methods Selection

Choosing a method will depend on many factors such as: context, time available, skill available, practicalities, access, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on.

The simplest guide is to think about your basic intention – ask am I setting out to: understand, explore, describe, explain, improve, build or prove.

Common Research Methods

Case Studies	- understand
Vignettes	- explain
Action Research	- improve
Experiments	- prove
Surveys	- describe
Grounded Theory	- explore



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Research Method Example

Suppose my Research was about looking at the trustworthiness of computer users in a situation where personal data is being handled such as Youth courts.

Here we are trying to explore trustworthiness and the scale is large and the data is very sensitive in terms of accuracy, potential loss or improper disclosure.

I decide therefore that I need an exploratory study here just to try to identify key Points and ideas. This makes me think of Vignettes.

Vignettes are like tiny case studies that just illustrate ONE important point at a time so a collection of these would indicate several important points in trustworthiness and those points could then form the basis for a more extensive study or to initiate debate about the problem theme.

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Vignettes Outline

1. Vignettes are used where actions, motives and judgements are to be explored often in sensitive situations.
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Useful when the research question starts with 'how' or 'why' and there is a desire to explore and describe some activity or phenomena.
5. You cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept.

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Data Collection Protocol

It is very easy to become confused between a Research Method and a Data Collection Protocol.

What is the difference between a survey and a questionnaire?

A Research Method is a framework that surrounds the whole research design

A Data Collection Protocol is a process for actually collecting the defined data from appropriate sample points

Possible Protocols - interview, questionnaire, observation, role playing, seminars, focus groups, document searching and so on

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Data Collection Protocol

Vehicle – the mechanism employed by the researcher: interview, questionnaire, observation, role playing, seminar, focus groups, etc

Recording Profile – data will be recording: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria – a profile used by the researcher to identify a valid sample point from which data is collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. Without a profile we may not have any consistency in our data and it may therefore be meaningless.

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Data Collection Protocol

Location – this is just a definition of where or from whom you will get the data

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable.

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Research Design

Structure – It has two phases: data collection and data processing

Purpose – It has ONE purpose and that is to generate the intended project outcome by using the collected primary data. If it does not do this it is effectively worthless

Means – the Research Design achieves its purpose by defining two essential processes: a process to collect the primary data and a process to transform the primary data into the intended outcome.

An Input/output process
Primary Data → Use Research Design → Outcome

Objects – we need a collection of primary data and also one often uses other secondary data and technical sources to deal with both these processes

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Phase 1 – Core Idea

Recall – my problem was unsuitable download behaviours, my target is worker productivity and my outcome is a policy document.

BAGeD: This means Basic Activity for Generation Data. It is the core of the Primary Data collection phase and effectively points to the data you need.

Think of the BAGeD as something like a spotlight that you turn on so that only the data that you need is illuminated.

Suppose my BAGeD is based on describing (basic activity) unsuitable user behaviours (the data spotlight) with regard to the Internet and downloads.

Do not get confused here the BAGeD is about describing the data it is not about where the data is or how it might be collected

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Phase 1 – Complete Process

I prepare by making a list (e.g. from journals or books) of what I regard as unsuitable download behaviours which I use to guide me as I interview staff about what they do on the Internet. Every time I hear about a bad behaviour I make a note so I end up with a collection of bad behaviour incidents descriptions all embedded in my transcripts.

Now some of these incidents will be the ones on my initial list, some will be ones that I never thought of and some on my list may actually never occur - that is why I have to do the interview to get that data collection.

At the end of this first processing phase I have a collection of primary data in the form download behaviour incident description extracted from in transcripts

Now that I have a processing plan I go through the all the steps:

Define the data (BAGeD), Protocol, Locate the data and lastly Collect the data

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Phase 2 – Pre-Processing

In this study I have my data embedded in interview transcripts so to be efficient I must extract my essential Primary Data from the transcripts

Thinking – before I define my pre-processing I think a lot about what I want as an outcome to make sure that the data set that goes into the last phase is in a suitable form

Pre-Processing – I use my list of bad behaviours definitions and I go through each transcript extracting distinct behaviour incident descriptions to which I attach a name. I present this primary data collection as a catalogue expressed as a matrix of incident names, a short description, location and original user type.

Intension – to get a well-structured primary data collection that is in a form that is useful to me in generating my intended outcome

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Phase 2 – Process the Collection of Data

My second phase of processing is to take the collection of Primary Data and transform it into a policy which was my expected form of outcome

Process – Using the incident catalogue I derive a policy statement that would prevent or at least put limits on download behaviours.

Implicit in this last phase is that I have the understanding and skill to construct a policy. If I did not then it would be necessary for me to gain the necessary knowledge and skill before attempting that part of the research design.

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Phase 2 – Process Skill

Example - the University has a policy on assessment and that controls and limits what departments may do. A policy is most often accompanied by a strategy to deal with various aspects of the policy.

Policy - an expression of a prudent mechanism for controlling or limiting actions based on an underlying ethic as expressed in the mission. Structure: PLOT

P - Principles that are based on organisational values or on legislative or contractual elements

L - Links to other policies or documentary sources. If you are not careful you will find yourself overwriting or changing other policies instead of referring to them.

O - Definitions of the objects to be controlled

T - Track or monitoring elements that set limits on what is permissible. This element will form the bulk of the policy definitions



Phase 2 – Process Skill

Therefore the construction process for the download policy is:

- (P) Set out the principles involved (eg. limiting access, etc)
- (L) Make sure you are aware of any other related or relevant policies, legislative or contractual elements or standard formats (eg. Security policy, etc)
- (O) Defining the object to be controlled (e.g the internet, software resources, etc)
- (T) Set up how they are to be tracked and monitored (eg. Software audit, etc)

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Comments on Exploration



Choose just ONE significant problem and ONE outcome.

Be careful with Scope and Scale (setting limits on your work):

Scope – this means selection or choice. For example, here I might choose to only implement Call Tracking. The point is I set my scope by being selective.

Scale – the means number or extent. For example if I set my scope as looking at Call Tracking I now need to set the number of types of call I will include in my study.

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Common Errors in the Aim

Poor English – this often makes it near impossible to work out what the student is saying.

Confusion over Outcome and Target – the core element in the aim is the project outcome but it can also contain the target but it must be clear from the way one writes the aim what the outcome is and what the target is.

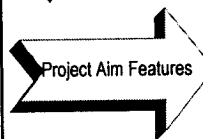
Operational Outcome – it is very common to see students focusing entirely on the target and omitting the outcome - such as "To generate improved accuracy in data entry to system XYZ" - no outcome and instead we only have the target.

Multiple Activities and Outcomes - there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just ONE clear outcome for the aim.

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Constructing an Aim



Target – what is to be achieved in the real world

Activity – what are you going to do to achieve the aim?

Spotlight – what is the data focus of the activity?

Outcome – what project outcome is wanted?

Example Aim – to create a website structure design using cascading style sheets in order that it might be used in design to improve web site accessibility.

Activity = create, Spotlight = cascading style sheets, Target = to improve accessibility, Outcome = web site structure design.

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Sample Aim 1

Sample Aim 1 – "To create an improved network infrastructure".

This is unsatisfactory because we have no target - we know that there will be an improved infrastructure but we don't know what effects that will have.

So is improved infrastructure the outcome – it cannot be because it would imply sending to Portsmouth for marking some object called "improved infrastructure" and that is an absurdity.

So here we have no target and no outcome and we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

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Sample Aim 2

Sample Aim 2 – "To build a Wi-Fi implementation strategy".

This is unsatisfactory because although we know the project outcome is (implementation strategy) we do not know what value it has in the real world because we have no target.

Notice also we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

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Features of Objectives

- Progressive** – the objectives must sequentially build to the aim
- Activity** – what are you going to do
- Spotlight** – what is the data focus of the activity
- Outcome** – what is the outcome of the activity
- Bounded** – achievable within the project period

Example – To model and document the software development process.

Activity = model, **Spotlight** = software development process, **Outcome** = a document, **Bounded** – yes we can do this in the project period (we cannot show progression as that only applies to the complete collection of objectives)

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Aim/Objectives - Checks & Balances

Many students get muddled with objectives and one source of this is that often they cannot distinguish between a project objectives (ones that are related to what a student does) and an operational one (things that happen in the real world).

Every time you write an objective you have to ask three questions about it:

- Can Justify** – does the objective make sense in that it generates a minor outcome
- Can Observe** – Make sure that someone else can observe or check what you have done so minor outcome must be in words, diagrams, charts, graphs etc)
- Can Build** – Make sure that YOU can build the outcome stated.

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Objective Examples

Aim = To report on how the bicycle is an aid to mobility in a modern urban environment

Sample Objective 1 – “To list in a report the components of a modern bicycle”.

This is fine and clearly it is something that you in a project document could do and Somebody else could check it.

Sample Objective 2 – “To describe how a bicycle functions”.

This is no good since although it is clear that you can develop a description no one can check it. Better to say “To describe by means of annotated diagrams how a bicycle functions”

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Objective Examples

Sample Objective 3 – “To understand how a bicycle helps urban workers”.

This is no good because although you can do it no one else can check it. Better to say “To prepare a report explaining how urban workers could be helped by use of the bicycle”

Sample Objective 4 – “To ensure that workers get to their office in time by using a bicycle”.

This is no good because you cannot do that and if you cannot do it no one can check it. Better to say “To report on bicycle usage strategies that might be applied by urban workers to ensure they get to work on time”.

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Objective Examples

Sample Objective 5 – “To implement a bicycle repair system”

This is no good since you can clearly do it but it cannot be checked in your project document. Better to say “Report on the implementation of a bicycle repair system” or “Produce a design document for the creation of a bicycle repair centre”

Sample Objective 6 – “To ensure that bicycles conform to BS 7898”.

This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written “To prepare a report showing how a bicycle can be evaluated for BS 7898 compliance”.

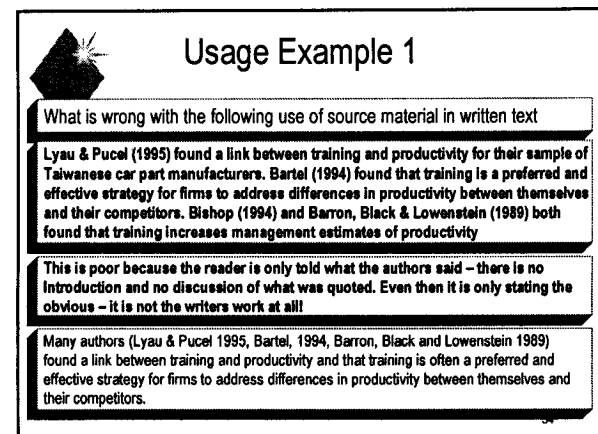
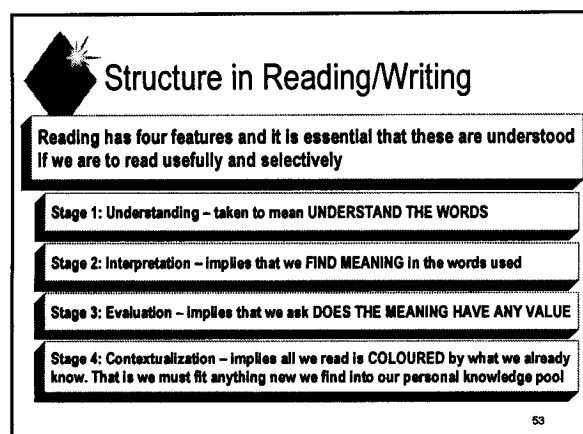
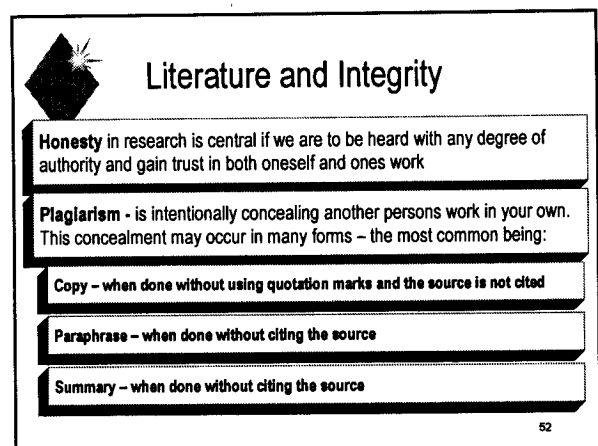
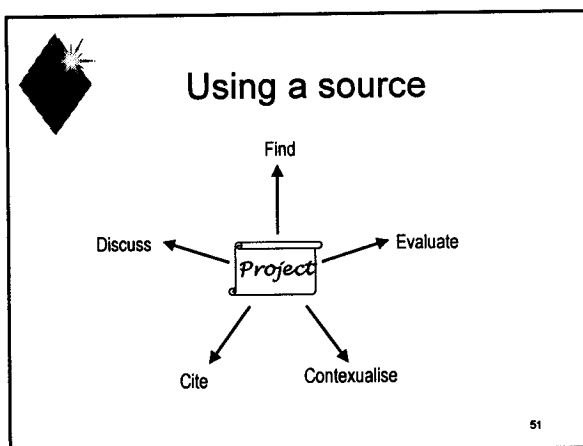
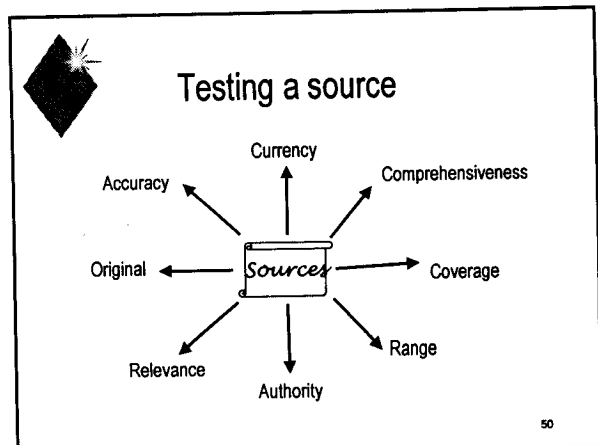
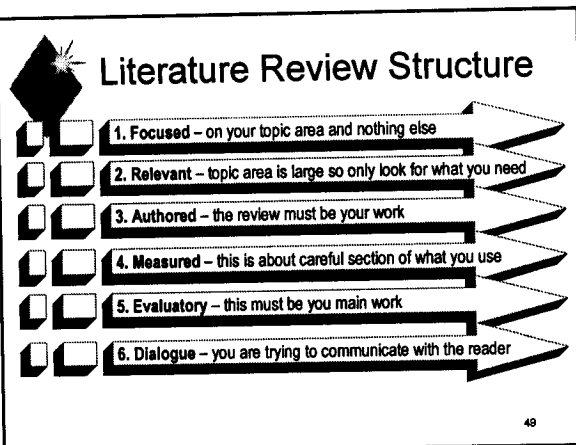
47

Literature Review

Literature Review – this is where one prepares the mind with all the necessary project area knowledge, understanding and skills. (see WB section 5.7.2)

- 1. List** – the various topic strands that have to be learned
- 2. Arrange** – topic list into a logical and progressive order
- 3. Theme** – decide on a theme to link topic strands
- 4. References & Bibliography** – use Harvard APA for this

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Usage Example 2

What is wrong with the following use of source material in the written text

It has been found that because Arabic words were written by copyists who did not use vowels, over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that something in the paragraph is attributed to Noldeke - but a reader does not know what that might be. Similarly, a reader can have no idea which part of the paragraph was written by the author of the text or maybe none of it was and it's a paraphrase. This is very bad practice and some tutors even regard it as blatant plagiarism.

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Correct Usage Example

There is a long standing problems with early Arabic manuscripts in that the meaning of many words has become obscure and even in places where the context is strong their meaning is still unclear [my introduction]. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowels, over time the meaning of some words has been lost [a paraphrase]. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding the meaning of some words [my discussion]. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use "assonance or word ending analysis" [a direct quote] to study words and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes [my discussion again].

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Usage Example 3

What is wrong with the following use of source material in the written text

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that "change in organisations is an inevitable consequence of growth" - this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdall is clearly obvious and that by Briggs is common knowledge. The point is that using citations here is unnecessary and therefore worthless.

It is obvious change in organisations is an inevitable consequence of growth and in the modern world that must imply continuous IT progression and updating. Many authors, notably St Clair-Tisdall and Briggs have commented on how these naturally progressive elements may be factored into a company sales policy and



Usage Example 4

Explain what the following section found in student work means

It is argued that tactness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

If we cannot understand what it is you are saying, then we cannot give you any marks. The sentences are obviously copied, no student would write with such obscure academic complexity - this are not designed to communicate, it is designed to impress other academics.

What it is saying is that some skills are very difficult to duplicate and this may mean that growth may be restricted or if you like it's not all that easy to copy a skill.



Literature Usage

Only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation

Common Knowledge: ... Briggs (1999, p23) said that OO is now routinely used in the computing industry

Obvious Observation: ... St. Clair-Tisdall (1994, p45) said that change in organisations is an inevitable consequence of growth

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Literature Usage

The literature is used to supplement you work, demonstrate your mastery of the topic area and lend authority to what you are saying by building on and learning from other peoples ideas.

Mastery of the topic area does not mean you quote, paraphrase or summarise everything you see or know.

Writing is a form argument and should only be seriously attempted when you are knowledgeable, the argument is essential and you have deep respect for your readers

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Project Supervision

Monitor Progress on a weekly basis

Advise on methods and matters of fact

Discuss any and all project elements

Read and comment on finished sections

Pose Questions regarding the student's work

Where necessary advise that the work is NOT ready for submission

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Some Questions

- If students get good marks and pass who should be praised?
- If students get poor marks and fail who should be blamed?
- If a student can recite what they have learned: are they knowledgeable?
- If a student gets 100% do they know almost everything?
- If a student gets 0% do they know nothing?
- What is the function of criticism/feedback on student work?

Learning is about your Thinking, Questioning & Practicing

1

What is knowledge?

- How do you know when anyone has knowledge?
- Knowledge may be simple (recall) or tacit (skill)
- He/she can reproduce it for you to see
- He/she can apply it in a given situation (problem solving)
- He/she can make generalizations from it
- He/she can generate new knowledge from it
- He/she knows knowledge is new, added to, modified or discarded.
- He/she welcomes criticism and regards it as essential to learning

2

An Example

Primary Data Definition - is new data in the sense that it will not exist as a collection until you define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme.

Exercise - Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them - is that primary data and is this a valid research purpose?

How can we know we understand

- All real knowledge is essentially tacit (a skill)
- One can only demonstrate knowledge by using it not reciting it

4

Critical Thinking

Much of our thinking, left to itself, is biased, distorted, partial, uninformed or down-right prejudiced. Yet the quality of our life and that of what we produce, make, or build depends precisely on the quality of our thought.

Shoddy thinking is costly, both in money and in quality of life.

Excellence in thought, however, must be systematically cultivated.

A Definition - Critical thinking is a process by which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them.

The Result - A well cultivated critical thinker

5

Weltanschauung

- Your personal world view is rough translation?
- It also has a hint of the idea of motive - why we do or think something?
- Suppose I have a problem of poor student work - speculate about possible causes and ask why you selected that cause?

Is enough feedback
reference material.
Knowledge.
No

6

politics
 ③ viewpoint
 ④ Influence
 ⑤ Religion
 ⑥ UAE (culture)

Weltanschauung why you think as you do

- Your culture and upbringing?
- Your religion or politics?
- The particular viewpoint you take?
- Influence of your teachers?
- Influences of what you read and hear?
- Ignorance?

Thinking Barrier - Culture

Culture - this can get in the way because it tends to have norms

Western - characterized by the notion of free speech and openness so I feel free to be critical of myself, my wife, religion, politics, the weather, the Vicar, the prime minister, the Bible, the Qu'ran, the Gita, etc.

Rationale - A society or an individual that limits such freedoms is ultimately self-destructive because it's as if there is nothing new to learn, nothing can be reinterpreted, nothing can be enhanced, nothing discarded as no longer valid and so no new thoughts and ideas are possible.

Eastern & Asian - characterized by a relatively closed society with a huge concern for what is right and a sense of uneasiness about criticism of almost anything but personal things in particular.

Rationale - society should be ordered, there is always a right way of doing things and respect is a dominant quality.

Culture - What can we do about it?

Nothing since it almost totally defines who we are

Awareness - we cannot and mostly do not want to get rid of our culture but we can become aware of it and how it influences and dictates the way we think and act and in that way it can become as a moderator for us.

Arrogance - sometimes our cultural heritage can make us arrogant so we will NOT accept that we might be wrong - so we stop listening and instead we keep repeating what we have already been told might not be right in some arrogant hope that someone will eventually comfort us by saying we were right

Thinking Barriers - Ignorance

Reading - we often do not read widely and sometimes not at all. This means our mind is not being continually stimulated.

Challenge - when we read widely our minds are challenged by new ideas

Argument - reading builds up our knowledge and makes us rational

Discussion - ideas can be used in discussion and communication

Possibilities - reading open our minds to new ideas and old ones

Pleasure - the process is pleasurable in itself

RCADP

What a Critical Thinker Does

- Problems - formulating them clearly and precisely as a starting point
- Open Minded - thinks about alternative systems of thought, recognizing and assessing their underlying assumptions, implications, and practical consequences
- Form of Answer - what sort of answer is one looking for to given questions
- Criticism - accepts and actively seeks criticism as essential to his work
- Data - Gathers/assess relevant information, using abstract ideas to interpret it
- Processing - comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards
- Communicates - with others looking for solutions to complex problems

What a Critical Thinking Is/Needs

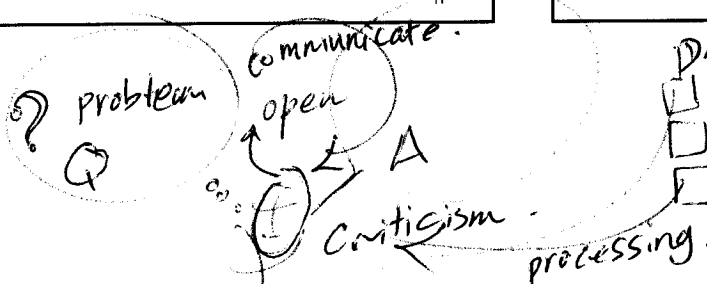
What it is

- Self-directed
- Self-directed
- Self-monitored
- Self-corrected

What it requires

- Excellence
- Communication
- Problem Solving
- Not Egocentric
- Not Sociocentric

ECPEs



CEPA

Some Exercises

Try to form a definition of the term problem itself?

A critical situation which requires a need to a solution

How many ways can we define to solve problems?

How is your problem solving ability affected by your weltanschauung?

13

What is a problem?

[Bryant 1989] problems are situations where circumstances confound action and doubt clouds decision

[Reitman 1965] proposed a categorisation of problems based on how well one could specify each of two terminal states.

[Simon 1985] proposed that a human being is confronted with a problem when he has accepted a task but does not know how to carry it out.

[Checkland 1989] a problem is a matter of concern or debate among situation actors

[Mayer 1983] a problem is a differences in two states and one wants to get from one state to the other.

14

Only 5 ways?

Trial and Error (T) - the process is akin to guessing and chance is at work and therefore problem solving may or may not take place.

Top Down (D) - the classical idea of divide and conquer - a complex problem is resolved into smaller and therefore simpler problems.

Generic Solutions (G) - using previous experience. This is a productive mechanism since we ask have we seen something like this before.

View Points (V) - if we have a clear idea of what view we have then we change our viewpoint so that we see the same problem in another light.

Relationships (R) - we consider how elements affect and are affected by other elements. This tends to be the deepest level of solution.

15

Two Application Methods

You can apply the strategies in sequence: {T,G} meaning do T then afterwards do G

You can apply the strategies in parallel: {T,G} meaning do T and G at the same time

You can do all this on your own or with other people

16

What is going on here?

Think of teaching a programming language as a problem. We could adopt either strategy a and b - now say what problem solving technique or techniques is being used in each one putting yourself first as the teacher and then as the student (what does it look like from a given perspective)

a. Teach in detail appropriate language constructs and gradually show how complete programs might be built.

b. Discuss whole programs and how program elements hang together, learning appropriate language constructs as they are needed.

17

What is going on here?

Brainstorming a problem is the recording of the rapid and free expression of thoughts about the problem and possible solutions. Brainstorming is carried out in three phases.

Generate - Ideas at random and in quick succession for a set period of time

Group - examine all the generated ideas and put them into a number of suitable categories or themes

Grade - finally the ideas are evaluated and ranked in order of importance in relation to the problem setting.

Examine this structure and see if you can write it down using a combination of the 5 strategies (T,D,G,V and R)

18

Learning – What is it?

Think about the following two questions:

1. What is the colour of your shirt?
2. Describe why this course will fit you for work in the modern computer industry or in business IT

Analysis
Synthesis
Evaluation

design

ASE

19

Learning – Can I do it?

Memorizing?
Understanding?
Reflection (Ijtihad or Taqlid)?
Problem Solving?
Finding Meaning?
Contextualization?

20

Two Ideas Poles Apart

Ijtihad – this means something like the idea of critical reflection in English but it has the added nuance of the idea of struggle (from the root jihad).

Why a Struggle – not so much because we might learn new things but those new things might mean you may have to modify what you thought was solid, you may have to find a new interpretation, and you may have to throw away altogether some things and start again – if you think about that for a minute you will realize there is considerable struggle implied.

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Two Ideas Poles Apart

Taqlid - this means something like blind unquestioning obedience to what you have been taught – it's as if nothing at all can be added either as ideas or interpretation.

In practice all we would be doing if we take this view is simply regurgitating what others have said and using the same methods over and over again and never moving forward. It's as if the idea of new knowledge itself has been discontinued, that we already know all there is to know.

22

How to Think

The prophet Mohammed in a Hadith is reported to have been asked the following question:

Question: Is it permitted to have doubts?

Answer:

Creative Doubt
Self-critical
Ask Questions
Challenge
Discuss
Reflection (Ijtihad)
Honesty

23

Skills Allied to Thinking

Read
Write
Speak
Listen

24

Thinking means Questioning

Bi-polar Questions – those with a limited range of answers

Is it possible to sharpen this pencil? (Y/N)
What is the correct pencil weight for drawing a picture? (HB1, HB2 etc)

25

Thinking means Questioning

Open Questions – give liberty to provide various forms of answer

Explanation: question expects an answer as a process/procedure

How can a pencil be sharpened safely by young children?

Description: answer expressed as a description or an evaluation

What is the purpose of HB0 pencils? (simple description)
Why are HB0 pencils difficult to sharpen? (an evaluation)

Exploration: answer in the form of a discussion

How should we use HB1 pencils best in drawing figures? (often an exploration is needed here leading to an explanation)

26

Dogma – what is it?

This simply means things you have to take at face value. Most often dogma is presented in such a way that one is not allowed to question it.

start from Dogma = The Truth

Religious Dogma – about heaven, hell, sin, what you can wear, eat, etc

Political Dogma – what is best for you, what is best for the country etc

Market Dogma – globalization, economics, trade, free markets, etc

Academic Dogma – theories, methods, tools, ideas etc

27

What is Thinking?

Some words from the Bible – Jesus said "If what you see causes you to sin, tear your eyes out and fling them away"

1. Can you understand these words?

2. If you can understand them what do they mean?

Ibn Rushd said - if the literal meaning of the words is clear but don't make sense the writer must have meant something else so we must find the meaning of the words

28

Dogma – what is its effect?

It tends to stop you thinking and questioning

Question – be honest with yourself and think about what you do when you see, hear or read something which is at odds with what you know or believe be it religious, political, academic or whatever?

The trouble with dogma is that it tends to make your rational mind BLIND

When a blind rationality sees, hears or reads something which is at odds with what it knows or believe the reaction is not to ask what does it mean BUT to blindly say it must be wrong

The Data is Wrong – students often come to me and say my data is wrong. What they mean is it gives them an answer that they don't like.

29

Dogma – what can we do?

Is Dogma therefore good, bad or neutral?

Can we stop people believing in something?

Learn to react in a listening manner so think for yourself

Learn to rationally question contrary opinion

Ask for and examine the evidence

Learn to be open-minded – accept for what they are other people views

Don't be afraid to disagree – but do it rationally if you can

Be aware of our own bias and prejudice

Accept that what you thought was truth might need to be changed

30



Dogma – what can we do?

- Listen to their teachers (notice it does not say agree with them)
- Listen to anyone (notice it does not say agree with them)
- Aware of ones own bias and prejudice
- Discuss freely without rancor
- Appreciate other points of view
- Be aware of the influence of ones own culture

31



A Student's Duty

- To continually ask questions of their teachers
- To continually ask questions about what one reads, sees or hears
- To challenge their teachers ideas and opinions
- To stop thinking that always there is a right answer
- To believe that there may be best answers
- To question what your own thinking
- To welcome criticism and not to look always for praise

32



An Anecdote

Good teachers are not enough YOU must find the best way for YOU to learn.

Imam Al-Ghazali went to University in Gurgan. He studied there for 4 years covering several subjects – indeed everything that could be learned there.

On his way back his caravan was attacked by Bedouins who took everything including all his course notes which were in a leather bag.

He begged the Bedouin chief to give him the notes as they were no use to anybody but him and in any case the Bedouin could neither read nor write.

The Bedouin then threw the bag of notes at Al-Ghazali and said "I thought you went to University to learn, not to take notes!"

Al-Ghazali was so struck by this idea that he went back to Gurgan for 4 more years, took no notes but thought a great deal and became one of the foremost scholars of his age or perhaps any age.



What Tutors do

- When asked a question try to avoid giving the answer directly
- Answer a question by asking another question
- Answer a question by asking students to do something
- Answer a question by offering several answers
- Answer a question by discussing its context

34



Challenging Students

- Answer a question by asking them to guess the answer
- Answer a question by asking if they can find a simplification
- Answer a question by asking if they have seen a similar problem before
- Answer a question by asking if they can find a different view of the problem
- Answer a question by asking if they can find any links within the problem
- Eventually the students will do all of the above to themselves

35



What is a Learning Community?



36

Speculation = Theory



Proposal Summary

Title – must be well specified and relevant

Problem Setting – this is the setting or background to your problem

Presenting Problem Definition – definition of a single significant problem

Real-World Target – this is a description of desirable real world effects

Research Question – constructed by linking the 5 SPITS elements

Intended Project Outcome – the object that will be used to generate the target

Design for Collecting Primary Data – data definition and collection process

Design for Processing Primary Data – process details to get the outcome from the primary data

1

vignettes = example

Que



Proposal Example 1

Title – Enhancing IT performance - an accelerator to post-merger integration

Problem Setting – ABC Media Group Plc is the result of a recent merger, making it the largest commercial broadcaster in the UK. IT performance is viewed as critical to the success of the new company and since several companies are involved it is important to merge business functions, processes and so reduce resource duplication which all assist cost saving.

Presenting Problem Definition – Post Merger Integration is crucial success element in any given merger because it enables common business processes and economies of scale. IT underpins most critical business processes and the system integration process and infrastructures will accelerate or delay the overall business merger.


2

*what I do (Explore, Build)
Smart interviews*

a research method ~~protocol~~

case study
Survey
Interview
Observation
Seminar

many collection protocols
away of collecting data
Questionnaire



Target - A reduction in the timescale needed to integrate IT in a post-merger environment, allowing a company to achieve cost and efficiency benefits soonest.

Outcome - A documented standard model for the planning and implementation of a merger based IT integration process.

Research Question - How can (interrogative) IT performance of disparate systems (problem) be enhanced to accelerate the process of post merger integration (target) by examining the system integration process (spotlight) in order to define an IT integration model for planning and implementation. (Suggested outcome).

Design for Collecting Primary Data - The key activity here is to identify and explore IT integration activities performed and decisions made by individuals and groups in a pre-merger situation and post-merger reviews. To fully explore the decision making process and explain actions there will need to be interactive elements to primary data collection. Therefore a mixture of semi-structured and in-depth interviews coupled with document analysis.

No important in Order


Sept 21/22

(What you need)
define (Which)
where is the data
How to collect

Where

define
Locate
Collect
Recover

fully understand the past flow
How to Record the data < audio



Design for Processing Primary Data - Here I am looking to eventually produce a model for the IT planning and integration process so I will use the usual model idea of linking activities and processes. Given this, the data may best be interpreted with the aid of tools from Soft Systems Methodology starting with a Rich Pictures to aid with understanding, interpretation and the sharing of perceptions on of specific events. From this we may use the basic SSM tools of Relevant Systems and Root Definitions and hence move to the conceptual modelling stage and then on to...

Summary of what we will do

- Define - Problem and associated target
- Research Question - at a minimum linking problem and target
- Outcome - the object to be generated: model, report, theory, a matrix,....
- Aim - to link outcome and target
- Objectives - a set of activities that generate minor project outcomes
- Research Design Part 1 - define the data and state how it is to be collected
- Research Design Part 2 - process the collected primary data to get the outcome

Basic Research Structure

- Topic Area - this just define the general area in which you are working this is a simple step and although part of the process is not a key elements in focusing
- Problem - define a single significant problem
- Target - say what real-world effects will be produced if we can solve the problem
- Outcome - what is it that you can produce that will generate the target effects

Cyclic Research Structure

Handwritten notes: "target verb" with an arrow pointing to the Target box, and "outcome produce" with an arrow pointing to the Outcome box.

An Important Distinction

- Problem - is something that is a matter of concern or debate in a given situation
- Target - this is the real-world effect that you want to produce. It might be things like: Improved network infrastructure, strategic Technology alignment, reduce network down time, a heightened awareness of security etc. (VERBS)
- Outcome - this is what you produce as part of your project, dissertation or thesis. As we have seen the idea is that we can use this outcome to generate the target effects. Possible outcomes are: a model, an explanation of some behavior, a usage protocol, a feasibility report, a post implementation review etc (Nouns)
- Features of an outcome - when you name your outcome ask: can I write it down, is it easily observable, can it be placed in a document, can it be sent to Portsmouth for marking. If it is any or all of these its probably an outcome

Can I define a problem?

Example 1 - My problem is to find a way to implement a new network infrastructure"

I might reword this as "my problem is to find an answer" - I think you will agree that such a formulation is worthless."

It is better to start off with a problem idea such as uncertainties associated with the technology needed for the proposed new network infrastructure.

Example 2 - My problem is lack of IT training in the help desk staff

This is hopeless because in fact it is a solution not a problem. It is obvious that if the problem is lack of training the solution is to give training so for all practical purposes that sort of formulation is worthless

Much better to say, in this case, that the problem is complaints about help desk operation from customers.

Can I define a problem?

Example 3 - My problem is to decide if a training policy can be constructed to deal with the data entry errors in our CRM system

Its so obvious really that you may miss it - "decide can be .." well of course this CAN be done so its not much of a problem is it if we already know the answer. In effect the student is saying his problem is to know if there is solution.

The problem is data entry errors and that is what needs to be analyzed

Handwritten notes: "decide/can be" and "avoid close question."

Here are the most common faults we see when we look at problem definitions

Listing many problems,
 Stating the problem as something to do,
 Stating the problem as being something is missing
 Stating a solution not a problem,
 Stating the problem is the problem
 Trivial problems,
 Non strategic business IT problems,
 Not stating a problem at all.

Can you make the Distinction

1. A strategy
2. Increased productivity
3. Better fit with technology
4. A best Practice Model
5. Improved sales
6. A security policy
7. Highly usable systems
8. Efficient network control
9. A pattern of work
10. A process flow
11. Simpler Web Page Access
12. A role description
13. Better trained operators
14. A list

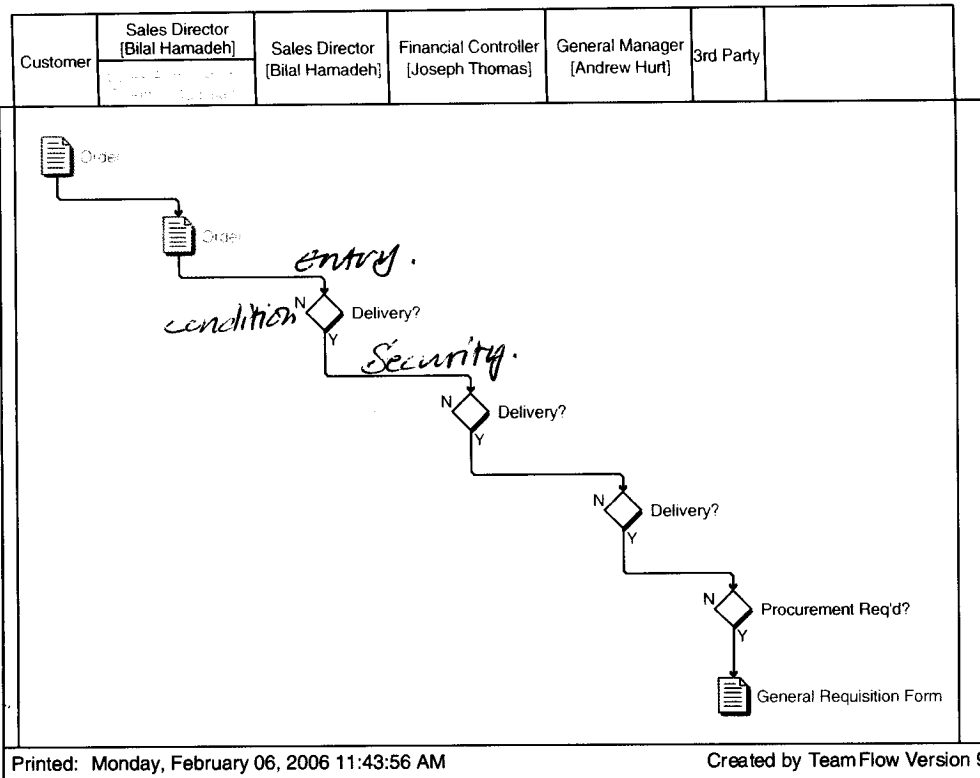
15. A theory
16. A feasibility report
17. A computerised sales program
18. A post implementation review
19. A predicative report
20. A process description
21. A model or framework description
22. Improve IT management
23. A definition or set of definitions
24. A comparison matrix
25. A design
26. A methodology
27. A security protocol
28. Secure passwords

some thing
 we use to generate

Target the effect

Target → verb.

Outcome → Hard copy.



Organization chart

- ① information gathering.
- ② Analyzing & Design [mapping to the system] Re-engineering
- ③ Developing [programming]
- ④ Testing.
- ⑤ production.
- ⑥ Training.

- presentation.
- Task.
- Objectives.
- Approach.

Team
Time/priority/doc

cross function (the same team task).

✓

Task

✓

meeting

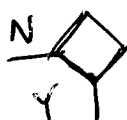
X



Report

/doc or other product generated.

X



Decision.

X



milestone / End one phase of the process.



Disk Document
Online Doc.



Notes Document / Online Lotus Notes.
process. database.



Sticky Notes may be floated
or Sticky.

✓

#

Report 2 / octagon / Home Plate / Hexagon / Stop Sign / Merge
Extract / Barred Diamond.



flowchart:

1. Sticky Note.
2. color coding.
3. Symbol key.
4. No overlap.
5. Basic.
6. phases.

sig

meeting (- distribute the copies .
- scope of the work /
critical → priority for the process → management .

OTC = order to collect (the money) .

~~CBP~~

• (Athens.com)

user name	uls 02 701421
pass	iqx 0654
250	(250 100 100)

double entering data

• profile
• specification
1000
12000

— Story.
— Org Chart.
— Responsibilities.
— Approachment

GS

Rockwell Condense
Extra Bold

Time wasting

Time wasting
Because Time = Money.
+ Double tasks.

double

(Hard copy Distribution list)

Xerox Eliminates Organisation Structure.

the Red highlighted ~~are not~~ ~~are~~

- Project members.
- Extended

document management
System is the Solution.

	profile	250
	proposal	450.
	Specification	3000
Introduction	Chapter ①	1000
	Description.	12,000
		13,000

(proposal).

TPS

We Need Quickly Tasks
Eliminates Time Wasting
~~We Need a Solution~~

Because.
Time = Money.
~~We Need a Solution~~
To Save Time

a

←

1, 2

I. Title: Document Management Strategies

II. Background: Managing documents is important for any organization. Every company has its own document storage and retrieval systems. A document management system (DMS) is a set of computer programs to track and store electronic documents and images. Document management systems basically provide storage, security, metadata, versioning as well as indexing and retrieval capabilities. DMS is increasingly being used in UAE both in private as well as government sector. e-Tawasul-Document Management system of UAE e-government is one such example.

III. Presenting Problem Definition: Despite being time, space consuming and expensive to maintain, use of traditional DMS still persists. Adopting proper document management strategy is therefore very important. DMS has far more potential than merely reducing paper work. Organizations in UAE need proper DMS strategies to efficiently track and store documents.

III. Real World Target: Inform UAE companies about the advantages of an efficient DMS. The reduced time for data retrieval, storage and security can help companies reduce storage, distribution and people costs.

IV. Research Questions: What are the bottlenecks in present DMS in UAE? How can they be overcome? How can they be optimized to reduce storage, distribution and people costs?

V. Personal Theory: DMS is very important for an organization. I believe that DMS can significantly help UAE organizations in storage, retrieval, filing, security, archival, retention, distribution, workflow and creation of documents. DMS can help UAE companies to reduce storage, distribution and people costs.

VI. Intended Project Outcome: The project aims to come up with strategies for efficient document management. It will analyze the reasons for Data Management bottlenecks in UAE organizations and suggest strategies and best practices to overcome them. Proper approach for migrating from a traditional to a modern DMS will also be laid down.

VII. Strategic IT Value: DMS not only helps in cost reduction but also in increased productivity of the employees. UAE Organizations can achieve substantial business benefits like improved customer service, reduced order-processing time, faster internal approvals, improved AR and collections, reduced processing errors and increased business process control by implementing modern DMS strategies.

VIII. Design for Collecting Primary Data: I will analyze bottlenecks and complications in document management processes. It will involve analyzing present document management processes in UAE organizations. I will interview key people in the organizations for collecting primary data.

IX. Design for Processing Primary Data: I will use the collected primary data to analyze reasons behind DMS bottlenecks. I will also evaluate successful approaches adopted in organizations to tackle them. I will then suggest effective strategies for document management.

Literature Review

Document management is a vital function in any organization. Every organization has its own document storage and retrieval systems based on its requirements. Document Management System (DMS) is defined as a set of computer programs to track and store electronic documents and images. Document management systems basically provide storage, security, metadata, versioning as well as indexing and retrieval capabilities.

DMS is increasingly being used in UAE both in private as well as government sector. e-Tawasul-Document Management system of UAE e-government is one such example.

Dubai Land Department has completely digitized its document. It has implemented a DMS from FileNet. The DMS will make its land and property transactions faster (*"Dubai Land"*, 2006).

Key Document Management System (DMS) Areas

Any document management system in a UAE organization needs to address important questions under the following key DMS areas:

Storage: UAE organizations first need to decide where they want to store their documents and the budget they have for their storage.

Retrieval: The next question is how to retrieve the documents and how much time they can spend to search for them.

Filing: How are the documents organized? What steps the organization needs to take to ensure documents are filed appropriately?

Security: How does the organization safeguards itself against loss, tampering and destruction of documents? What mechanism it follows to keep its classified information secure?

Archival: What steps has the organization taken to maintain the readability of its documents in future? What mechanism has it in place to keep its document safe?

Retention: A very important point is to decide which documents to retain and which to discard. What should be the life period of a document and what should be the process to discard it?

Distribution: Getting the document across to people on time is also extremely important. How much can the organization budget for document distribution?

Workflow: How will the flow of documents from one person to another be maintained? What will be the rules to guide the flow?

Creation: Rules on collaboration in the creation of document among staff is equally important.

DMS Components

Document Management System basically comprise of storage, versioning, metadata, security, indexing and retrieval capabilities.

Metadata: Metadata of a document includes information about the date of storage, person saving the document, scanned images or text.

Integration: Integration is done so that users can retrieve existing documents directly from the document management system, make changes, and save the changed document back as a new version.

Capture: Capturing involves the process of using scanners or multifunction printers to take the images of paper documents.

Indexing: Indexing is done to keep track of the documents. It is vital for swift retrieval of the documents. Creation of index topology is an important part of this process.

Storage: Storage of the electronic documents often involves issues like where the documents will be stored, how long will they be stored, when and how will they be transferred from one storage media to another and when will they be finally destroyed.

Retrieval: Retrieval involves finding the stored document from the storage. This may be a simple process for individual documents to more flexible retrieval involving document identifier or meta data.

Other DMS components are **Distribution, Security, Workflow, Collaboration, and Versioning.**

Advantages of DMS

DMS has numerous advantages. UAE organization can implement a lot by investing in DMS. Some of these advantages are as follows:

- 1) DMS helps in cost reduction and increased productivity of the employees. Document management systems eliminate the cost of lost documents
- 2) Organizations can achieve substantial business benefits like improved customer service, reduced order-processing time, faster internal approvals, improved AR and collections, reduced processing errors and increased business process control by implementing modern DMS strategies.
- 3) Document management systems provide several layers of security like password protection, encryption and audit trails.
- 4) DMS help include off-site data backups and other mechanism to save data in the event of a natural disaster.
- 5) DMS allows multiple accesses to the same document.
- 6) DMS helps in ensuring process consistency.

Implementing DMS

A good requirement analysis is important for implementing a document management solution. We need to ask the following questions before choosing a DMS:

- 1) What documents exist?
- 2) Who created them?
- 3) What are they used for?
- 4) Which areas of the organization need document management?
- 5) Which of these documents are confidential?
- 6) What documents need to be retained?
- 7) What technologies can be implemented?
- 8) What is the budget available?

Based on the answers to these questions a Business Requirements document is prepared and this helps in choosing an optimum solution. The process from defining requirements to selecting a solution differs from organization to organization. It also requires discussion with the stakeholders within the organization.

While implementing a DMS several concurrent processes are undertaken. These processes can be summarized as follows:

- 1) The technology implementation process is done through IT department. It involves hardware configuration, installing the operating system and application software components.
- 2) Discussion is done with people in key business areas of the organization. This is done to find out how a task is completed. If required the existing procedures and guidelines are reworked.
- 3) The third process is configuration. It requires sampling business documents and finding what is common in them. Document categories and access level of the document is also defined.
- 4) The fourth process is the most important. It involves people working with the organization. The goal of a successful DMS is to satisfy the end users apart from meeting the management's requirement.

DMS in UAE

UAE organization both in government and private sector are implementing DMS to ensure greater operational efficiency. Implementation of DMS is part of the 'paperless' initiative undertaken by the government and private sector. It is helping in automating, accelerating business processes, boosting efficiency saving costs.

Dubai Municipality (DM) is implementing Enterprise Document Management System (EDMS) in collaboration with IBM and Etisalat. It will help in improving internal and external business processes by creating a single document repository solution (*"Dubai Municipality", 2006*)

Challenges In DMS Implementation

Successful DMS application in UAE faces many challenges. Some of them are technical while others are cultural.

- 1) Resistance to change
- 2) Integration with existing legacy systems
- 3) Scale of the project.

Project Specification

Intention -- This study is focused on laying down DMS strategies for Organizations in UAE. It will inform UAE companies about the advantages of DMS, find bottlenecks in their implementation and suggest strategies to overcome them during implementation.

Project Title - Document Management Strategies

Project Topic Area Overview

Managing documents is important for any organization. Every company has its own document storage and retrieval systems. A document management system (DMS) is a set of computer programs to track and store electronic documents and images. Document management systems basically provide storage, security, metadata, versioning as well as indexing and retrieval capabilities.

DMS is increasingly being used in UAE both in private as well as government sector. e-Tawasul-Document Management system of UAE e-government is one such example.

Dubai Municipality (DM) is implementing Enterprise Document Management System (EDMS) in collaboration with IBM and Etisalat. It will help in improving internal and external business processes by creating a single document repository solution (*"Dubai Municipality", 2006*)

Situation Overview

The study will look at the introduction of DMS in UAE organizations. It will involve interviews with employees of the organizations implementing DMS and consultants from the implementing agencies.

Presenting Problem Definition

Despite being time, space consuming and expensive to maintain, use of traditional DMS still persists. Adopting proper document management strategy is therefore very important. DMS has far more potential than merely reducing paper work. Organizations in UAE need proper DMS strategies to efficiently track and store documents. There are cultural as well as technological challenges to DMS implementation.

Real-World Target

This study will inform UAE organizations about the advantages of an efficient DMS. The reduced time for data retrieval, storage and security can help companies reduce storage, distribution and people costs. It will also help UAE organizations in improving their internal and external business process. The study will suggest strategies for the seamless implementation of DMS in UAE organizations.

Research Question

The study will address several key questions in DMS implementation in UAE. Some of these are:

- 1) What are the bottlenecks in present DMS in UAE?
- 2) How can they be overcome?
- 3) How can they be optimized to reduce storage, distribution and people costs?
- 4) What are the challenges in successful DMS implementation in UAE?
- 5) How each group of involved in DMS implementation perceives it?

Personal Theory

DMS is very important for an organization. I believe that DMS can significantly help UAE organizations in storage, retrieval, filing, security, archival, retention, distribution, workflow and creation of documents. DMS can help UAE companies to reduce storage, distribution and people costs. Successful implementation of DMS involves many challenges and requires addressing several key issues.

Intended Project Outcome

The project aims to come up with strategies for efficient document management system. It will analyze the reasons for Data Management bottlenecks in UAE organizations and suggest strategies and best practices to overcome them. Proper approach for migrating from a traditional to a modern DMS will also be laid down.

Strategic IT Value

DMS not only helps in cost reduction but also in increased productivity of the employees. UAE Organizations can achieve substantial business benefits like improved customer service, reduced order-processing time, faster internal approvals, improved AR and collections, reduced processing errors and increased business process control by implementing modern DMS strategies. Proper DMS implementation will help UAE organizations in improving their internal and external business process.

Ethical Overview

DMS implementation does not raise any ethical questions as it is done for efficient document management in an organization. These DMS have various levels of access to protect classified information.

Aim

The aim of this study is to lay down DMS strategies for Organizations in UAE. It will inform UAE companies about the advantages of DMS, find bottlenecks in their implementation and suggest strategies to overcome them during implementation.

Objectives

- 1) To analyze the implementation of DMS in UAE organizations.
- 2) To convince UAE organizations of the advantages of a modern and well implemented DMS.
- 3) To find out bottlenecks/challenges in successful implementation of DMS in UAE organizations. This will involve conducting interviews with employees, management of the organization where DMS is being implemented as well as the consultants of the company implementing the DMS.
- 4) To suggest ways to overcome these bottlenecks. This will include strategies for successful implementation of DMS, overcoming challenges in DMS implementation based on the primary data collected through interviews.

Research Design - Research Method

This study will be based on interviews with staff, management of the organizations implementing DMS. Employees are directly associated with DMS implementation and their satisfaction is vital to the successful implementation of DMS. Well designed questions will be addressed to a selected group of employees from different business areas of the implementing organizations and management representatives from the organizations. This will also include interviews with consultants of the company implementing the DMS. Two of these DMS implementation under consideration are e-Tawasul-Document Management system of UAE e-government and Enterprise Document Management System (EDMS) of Dubai Municipality. Consultants from the implementing agency IBM will also be interviewed.

Research Design - Phase 1: Primary Data Collection Process

This part of the research design requires construction of a reliable primary data collection mechanism which will be processed into the form of answers expected at a later stage. The questions for the interview will be well designed and will address the key areas of DMS implementation. The questions will be formulated in such a manner that they address the various aspects of the DMS implementation that involve contribution on part of employees, management and consultants. A successful implementation of DMS requires good collaboration between these three groups. These questions will then be put forward to a representative sample comprising of employees, management and consultants from UAE government's e-Tawasul-Document Management system initiative, Enterprise Document Management System (EDMS) initiative of Dubai Municipality and implementing agency IBM.

Basic Activity for Generating Data

Basic activity for generating primary data is to interview employees, management in organizations where DMS is being implemented or has been implemented. Secondly, interviews will also be conducted with the consultants of the implementing agencies to find out their perceptions of the problems in DMS implementation and how they overcame these problems.

Primary Data

This study will ask specific questions to all the three groups of employees, management and consultants who are instrumental in successful DMS application. The answers to these questions will be the primary data for finding bottlenecks in DMS implementation in UAE organizations and the strategies required to counter them.

Location – The sample group for this study will include a representative pool of employees, management and consultants from UAE government's e-Tawasul-Document Management system initiative, Enterprise Document Management System (EDMS) initiative of Dubai Municipality and implementing agency IBM.

Collection Protocols – The data collection will involve interviewing each member of the sample groups. They will be asked questions related to their experience of DMS implementation. There will be questions related to the particular nature and experience of each group in DMS implementation. Employees will be asked specific questions related to their experience of DMS implementation in their organization. Questions like what do they think of DMS implementation, is it going to make their work process better, will it benefit them or their organization, what problems did they face during implementation, how it can be made better will be addressed to them. Management will be asked questions on cost savings, improvement in processes and its benefit to the organization, how did they convince employees about the viability of DMS implementation and how did they manage to elicit their cooperation. Consultants from the implementing agencies will be asked questions related to technological and cultural hurdles they faced, why they suggested a particular solution etc.

Primary Data Collection Presentation

The interview questions for each group and their answers will be available in the project document appendix. These questions and there answers will then be presented in the form of a table. Questions will be presented in rows while answers to each question by the sample group members will be presented in columns.

Research Design - Phase 2: Processing and Presentation

Research Design phase 2 will involve the processing of collected primary data from the interviews to arrive at desired conclusions. This will involve processing the raw data from the interview transcripts. The data will then be presented in graphical format as bar charts. The frequency of answers to each question will represent the bars for that particular question. The bar charts will be analyzed to arrive at the major issues for various groups. This will help in finding out the bottlenecks in DMS implementation in UAE and defining strategies for their successful removal.

Design of Pre-Processing for Primary Data Collection

The replies provided by those interviewed will be extracted from the interview transcripts and then processed. The answers to each question provided by the sample group members will be put together and their frequency calculated. An example of this can be the answer provided by employees about their perception of DMS implementation. Some may reply that it is very important; others may say that it required but not that important while others may reply that it is not required at all. The end result will be the frequency of answers to each option of the questions under consideration

Design for Results Presentation

The data from the first processing round will be presented in the form of bar charts with each bar corresponding to the frequency of answers provided to a question.

Design for Generating the Intended Project Outcome

After the bar charts are ready we can derive conclusions about the DMS implementation challenges in UAE. This will also give us the perspective of each group involved in DMS implementation. Based on this specific strategy for seamless integration of DMS in the organizations will be suggested. Most of the organizations implementing DMS will face common challenges or hurdles. Some of the challenges will be specific to the organization concerned. The suggested strategies will be more about the general problems on cultural and technological barriers to smooth DMS implementation in the organization. The study will also provide suggestions to overcome the specific problems being faced by the two organizations under consideration.

Few major challenges in implementation can be resistance to change, integration with existing legacy systems and scale of the project. These can be tackled by utilizing specialist input from all key business areas, technology providers, and the buy-in and continuous support of the management.

Some the challenges that where encountered during Dubai Land Department DMS implementation included fragmentation of information, slow customer transaction processing time and meeting more stringent regulations (*"Dubai Land"*, 2006).

Logistics and Tools – Resources Required

Logistics required will include a group of three people who will conduct interviews with three groups involving two UAE organizations being studied. Literature review on DMS, its advantages and challenges in its implementation will also be done. This will help in adopting a focused approach to DMS implementation cases under consideration. Literature review will also help in having a theoretical base to DMS implementation and challenges.

Content List for The Project

- Project Specification
- Project Timeline
- Questionnaires
- Interview transcripts
- Basic Information on DMS implementation cases under consideration
- Glossary

References

Dubai Municipality Adopts New Systems for Document Management and Electronic Correspondence. (2006, Nov 11). Retrieved Feb10, 2007, from <http://www.newswiretoday.com/news/10972/>

Dubai Land Department Digitalises all Documents by Implementing FileNet Document Management Solution. (2006, Sep 7). Retrieved Feb 10, 2007, from <http://www.ameinfo.com/95639.html>

I will require five weeks for this study on DMS bottleneck and implementation challenges in UAE.

Project Plan - Master Schedule expressed in weeks					
Dates	February			March	
Event	12	19	26	4	11
Literature Review					
Analysis, planning and design of interview questions					
Conducting Interviews					
Process primary data & derive conclusions					
Formulating Strategies					

I. Title: Document Management Strategies

II. Background: Managing documents is important for any organization. Every company has its own document storage and retrieval systems. A document management system (DMS) is a set of computer programs to track and store electronic documents and images. Document management systems basically provide storage, security, metadata, versioning as well as indexing and retrieval capabilities. DMS is increasingly being used in UAE both in private as well as government sector. e-Tawasul-Documents Management system of UAE e-government is one such example.

III. Presenting Problem Definition: Despite being time, space consuming and expensive to maintain, use of traditional DMS still persists. Adopting proper document management strategy is therefore very important. DMS has far more potential than merely reducing paper work. Organizations in UAE need proper DMS strategies to efficiently track and store documents.

III. Real World Target: Inform UAE companies about the advantages of an efficient DMS. The reduced time for data retrieval, storage and security can help companies reduce storage, distribution and people costs.

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VI. Intended Project Outcome: The project aims to come up with strategies for efficient document management. It will analyze the reasons for Document Management bottlenecks in UAE organizations and suggest strategies and best practices to overcome them. Proper approach for migrating from a traditional to a modern DMS will also be laid down.

VII. Strategic IT Value: DMS not only helps in cost reduction but also in increased productivity of the employees. UAE Organizations can achieve substantial business benefits like improved customer service, reduced order-processing time, faster internal approvals, improved AR and collections, reduced processing errors and increased business process control by implementing modern DMS strategies.

VIII. Design for Collecting Primary Data: I will analyze bottlenecks and complications in document management processes. It will involve analyzing present document management processes in UAE organizations. I will interview key people in the organizations for collecting primary data.

IX. Design for Processing Primary Data: I will use the collected primary data to analyze reasons behind DMS bottlenecks. I will also evaluate successful approaches adopted in organizations to tackle them. I will then suggest effective strategies for document management.

Username: PL30016
Password: td929k

Stage 1 - Research Methods Time				
Routine	Morning		Afternoon	
Timings	0900 – 1030	1100 – 1230	13.30 – 1430	1430 – 16.30
Monday	Critical Thinking and Preparation of the mind	Topic selection, Problem and target	Tutor access	Library and Online work
Tuesday	Speculation, Research Question, Primary Data and project outcome		Guest Lecture	Tutors available for consultation
Wednesday	Research Methods	Data definition, collection & processing	ba lim	Tutors available for consultation
Thursday	Preparation of a proposal		Carl Adams	Tutors available for consultation
Friday	Literature Reviewing	Aim and objectives	Tutors available for consultation	
Note: Non ACE International Students need not attend on the first day until 0930				

Stage 2 Project Start Up Times				
Routine	Morning	Afternoon		
Timings	0930 – 1230	12.30 – 1330	1430 – 16.30	
Monday	Project Chapter profiles	Lunch	Self study in Library	
Tuesday	Literature Reviews	Lunch	Self study in Library	
Wednesday	Research Designs	Lunch	Self study in Library	
Thursday	Supervisor Meetings	Lunch	Self study in Library	
Friday	Supervisor Meetings	Lunch	Self study in Library	

Exercise 001a.01q – What is a problem Definition
Do you have a problem definition and it is clear. Just to help you in this exercise here are the most common faults we see in supposed problem definitions and some notes on problem formation with a concluding exercise.

When you have completed the exercise post you answer into the first Tutor: Discussion Question 1 as shown below. But to do this:

1. Do NOT post answers as attachments as it is laborious for any one to extract and looks at it. Post it straight into the message window and then apply a little formatting.
2. Do NOT post any notes that come as part of the exercise. Just post the question and your attempt at an answer.
3. If you wish or you cannot manage to do all the exercise you can just post part of the exercise.

4. Select one or more posts from another student and read their answers and send comments to him/them.
5. Do NOT send your answers to me. In about a week's time I will send out my suggestion as an answer but if you just ignore the exercise and wait for the answer that will be of no value to you and such laziness is certain to end up in a failure because you simply have not done the work.

6. Full records are kept so if we never see any postings from you the panel who look at you work later will draw their own conclusions about your commitment and readiness to start the project phase.
7. The POINT of these exercises is to make sure you really KNOW what you are doing and get the very best result you can. Not doing them is simply a negative reflection on your commitment and can only lead to disappointment.

Topic	Unread	Total	Status
Induction - Bright Angel Exercise	0	39	public, unlocked
Induction - How you learn best	0	15	public, unlocked
Induction - Succeeding as an online learner	0	0	public, unlocked
Tutor: Questions about the Project Specification	0	0	public, unlocked
Tutor: Questions about the statistics coursework	0	4	public, unlocked
Tutor: Discussion Question 1	0	0	public, unlocked
Tutor: Discussion Question 2	0	0	public, unlocked
Tutor: Discussion Question 3	0	0	public, unlocked

What is a problem?

This question has always been difficult to answer since the notion of a problem is hard to pin down. As (Bryan 1989) points out 'examination of dictionaries leads to such definitions as "a problem is something to be solved" but then with a tautological unhelpfulness, cross reference you to a definition that states that "a solution is the answer to a problem". Neither of the above explanations is helpful and we might better take the following definitions as more realistic.

[Bryant 1989] problems are situations where circumstances confound action and doubt clouds decision

[Reitman 1965] proposed a categorisation of problems based on how well one could specify each of two terminal states.

[Simon 1985] proposed that a human being is confronted with a problem when he has accepted a task but does not know how to carry it out.

[Checkland 1989] a problem is a matter of concern or debate among situation actors

[Mayer 1983] a problem is a differences in two states and one want to get from one to the other.

I know the solution

In research we often start by stating a FORM of answer (the MSC project outcome) - that is we know for example the outcome of the project will take the FORM of a report but of course at that stage we do not actually have the report and will not have it until we do the actual research.

However, students often write down the problem in such a way that it is an answer or solution to the problem. So for example, if one writes a problem statement as "lack of training" then implicitly that is a solution as well because it is obvious the answer then becomes "provide training". When this happens it is almost certain that the writer is not thinking about the problem at all but is obsessed with a particular solution. In this particular case the real problem might have been "errors in data entry" and one of many possible solutions is training.

If one cannot define the problem with some degree of clarity then other things in the project definition start to fall apart and gradually the idea disintegrates because in essence without a clear problem to solve one has no direction and then the we might recall the aphorism "if one aims at nothing you will probably hit it".

Defining the Problem

Notice, that it is your own definition we are looking for not one you might look up in a book or on the internet (though you might start with that) because there is often little learning value in just copying a definition as far as deepening your own understanding is concerned.

Remember, that any definition one constructs will not be absolute and universally accepted by everyone - but in research this is not a problem as long as the researcher makes it clear what particular definition is being taken. Do not take this process too far and end up with either over-complicated or trivial definitions - they must be thoughtful and comprehensive. So it is recommended you start by thinking about four things where the acronym CAPE is used:

Characteristics - observable features or facets of the problem idea,
Associations - every problem with have links to other situation elements,
Perspective - when a problem is encountered it will always be from a certain perspective
Effects - say what effects ensue in the real world if the problem is not resolved.

Defining the Problem - Example

Let us suppose that a student has identified the problem theme as Phishing. Naturally, the student will be concerned that this is a good idea and would like confirmation of that before expending time on it. One can ask the course tutor, but he/she is not expert in everything so at best one would only get an opinion as a response so how should a researcher proceed. So for Phishing a researcher might note the following:

Characteristics: illegal, intrusive, upsetting, prays on those who trust their fellow man, etc
Associations: email, chat, file sharing, etc.
Perspective: management (but try to look at it from several perspectives as well)
Effects: destroys confidences in the system, may lead to personal or company losses etc

Normally, it takes quite a few attempts before a definition that is lucid and comprehensive is obtained. Remember, the definition must also be useful within your research study - that is, it's no good having a well formed definition that does not offer a sound basis for a research effort.

Exercise 1

Look at each of these simple supposed problem statements from students and say what faults are evident?

1. My problem is many customer complaints, lost of revenue and managerial weakness.

Solution: My problem is lack of IT training.

3. My problem is to find a way to implement a network infrastructure

4. My problem is growth of phone sales in Hong Kong

5. The problem identified in the topic is how to solve the large number of customers' enquiries via internet broadband hotline service once the customers call the hotline centres

① problem in another problem

② Should focus on real problem

Page 3 of 4

broband

(Hotline centres)

Not doing any thing with IT

(Statistics)

The case for simple statistics in strategic business decision making, or Data driven approach to business hypothesis generation

- You are a consultant brought in by an electronics distributor and consumer sales company to identify potential new markets for electronic gadgets
- Specifically, the company wishes to move from 1st generation electronic goods (TVs, VCRs, desktops) to second generation goods (PDAs, laptops, wireless technologies) with a view to addressing the needs of younger consumers who now have greater buying potential than ever before

Imagine...

Data

- The electronics sales company has an extensive database of its customers obtained when customers return post-sales questionnaires to complete the registration of their products
- The company has also purchased from other sources data concerning their customers

Your task

- To examine the data using traditional analytical IT techniques to determine future strategic business planning for the company
- To identify specific customer groups that the company can then target with their products

future strategic business planning
who?
whom are the target.

- Pearson chi-square tests the hypothesis that the row and column variables are independent (not related). The actual value of the statistic isn't very informative.
- The significance value (Asymp. Sig.) has the information we're looking for. The lower the significance value, the less likely it is that the two variables are independent (unrelated).
- In other words, if the relationship is significant, there is some relationship or dependency between the variables

- In this case, the significance value is so low that it is displayed as .000, which means that it would appear that the two variables are, indeed, related.
- You can add a layer variable to create a three-way table in which categories of the row and column variables are further subdivided by categories of the layer variable

- The purpose of a cross-tabulation is to show the relationship (or lack thereof) between two variables.
- Although there appears to be some relationship between the two variables, is there any reason to believe that the differences in PDA ownership is anything different income categories is anything more than random variation?

- A number of tests are available to determine if the relationship between two cross-tabulated variables is significant. One of the more common tests is chi-square.
- One of the advantages of chi-square is that it is appropriate for almost any kind of data.

Let's look at the significance value
 0.000
 → very significant
 ↓ 0.5

Check

(statistics)
 (PDA)

65. 1 ग्राम
उत्पन्न वि. न. 115/2

10:30
Angela 10:11

Computing

24.1.2007 (Fred Garlic)

Time to file

Catalogue

Collections: Main Catalogue

Keyword: unix

Title: computing

unix linux

comput*

Author: gates, bill (or Bill Gates)

Collections: Journals & Serials

Title: New Scientist

Keyword: comput*

Collections: Electronic Resources

Keyword: nanotechnology

Online Resources

1. Point out breadcrumbs:

Subject Directory / Exam Papers Database / Access to Other Libraries / Internet / Athens

2. On the Subject Directory page search for:

Compendex (via Engineering Village 2)

(point out that it's NOT on the list of computing databases). 1000s of journals, millions of articles (computing and engineering). Not full text but all available via print, ejournal or ILL.

Quick search distributed programming AND algorithm (14163 hits)

distributed programming AND algorithm* (14166 hits)

Demonstrate limiting search by 'Search in TITLE' for example, or date: 2005-2007

3. Subject Directory -> Computing & Info'n Science -> Databases

a. CSA Illumina

Quick search unix (note 'Published works' then 'All' 'Journals' 'Conf' etc)

(note 'Web sites' etc)

Adv search distributed programming

distributed programming AND algorithm (8 hits)

distributed programming AND algorithm* (28 hits)

Keywords clickable, View Record, Locate Full Text

InterLibrary Loans if necessary

my top stuff if you want it
[If break is required, show 3 minute video from Buffy the Vampire Slayer and point out how Russell they got their results from books, journals and the internet but didn't just rely on one.]
to short
these usually isn't time

b. INSPEC

c. TechXtra

Basic search

4. Subject Directory -> Computing & Info'n Science -> Electronic Journals

5. Subject Directory -> Computing & Info'n Science -> Organisations
(only tackle 5 & 6 if time) - usually not!

6. Subject Directory -> Computing & Info'n Science -> Reference Tools

e.g. FEVL

7. Internet Search Tools -> Search Engines & Directories -> Google Scholar

8. Internet Search Tools -> Search Engines & Directories -> Windows Live Academic

Explain nature of Google Scholar and WLA (beta testing, 'sources' not revealed, take care with results).

Referencing

saves time, avoid plagiarism (& punishment), give credit, & look good!

Or talk about this with database record on screen and demonstrate how to fill in the form from the fields on a particular record (plus user details and signing the back)

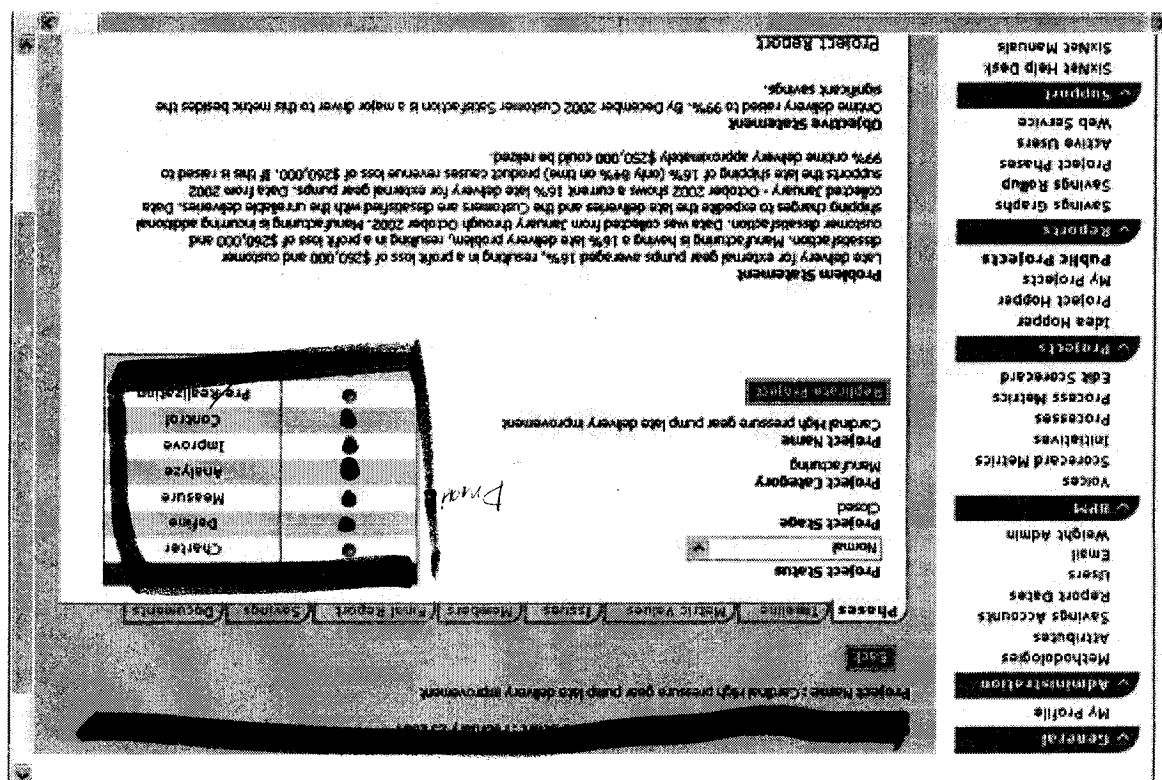
Mindmapping

Explain its utility for generating keywords to be used in searching (as well note taking in lectures, giving a presentation or planning a party!). Demonstrate how mindmap grows as additional keywords are found looking at keywords of database articles whether or not the article is required.

→ sometimes do this at start

& keep developing map through session.

Execution (3D) statistics.



Master Project Topic:

- 78- Document Management Strategies
- 81- Strategic Issues in Document & Information Management
- 82- Developing a Corporate Strategy for Document & Information Management
- 83- Document Management "Support for Critical Business Processes"

Title: Document management "Support for critical business processes."

Problem setting: Our problem is the Document management weaknesses which affects the business in certain ways
Xerox & their business in the use

Presenting Problem definition: (negative impact on the business) ...
Delays in delivery of the product
Rework (multi-task) ...
Cost (Problem field)

Real world TARGET: summarize the whole important impact in 1 or 2 sentences
Reduce the cost & more efficient document control

Research Question:

SPTS :

Spotlight: data flow of the work procedure in the company.
Problem :

Interrogative: How or what

Target: summarize the whole important impact in 1 or 2 sentences
Reduce the cost & more efficient document control

Suggested outcome: implementation plan or rebuilding plan or document plan
New document work flow
Plan to rebuild the current documentation work flow

Solution: Document management (documentum)

Intended project Outcome: *project implementation plan or a plan for managing the*
implementation of document management application (documentum)

There is an **objective** for:

1. The project
2. The document management system (application)

To define a project management structure

Design for collecting primary data : paged describe the current work flow

Or it could be describe the current documentation work practices.

Design for processing primary data : collection of documentation work practices, what I collect is actually what the people are really doing

How you will use this work practices to get the new work flow (outcome)
Apply a methodology to get the outcome

Help library

Timothy.collinson@PORT.AC.UK
ANDY.BARROW@PORT.AC.UK

WWW.PORT.AC.UK/LIBRARY

ATHENSE LOGIN DEMO (animation on how to use the university access)
[library catalogue / Search](#) : [collection](#) : [Electronic Resources](#).

Keyword: Java*

EJOURNALS

SUBJECT DIRECTORY: ELECTRONIC JOURNALS

SUBJECT DIRECTORY: DATABASE (ON COMPUS USERS) SEARCH / TECHNOLOGY -

PER.REVIEW ARTICLE(DOUBLE REVIEWED) it means these are the best article.

(Locate full text) ... show the full paragraph in the right place.

00442392843233 fax

Manag* and document* and strateg*

Distance & part time learners

Registration with the university library

Research Methods: Assessment No. 1a – Project Specification and Outline Literature Review

Introduction

The full assessment plan for the Master's programme can be found in Workbook 1 of the workbook pack – you must ensure that you are familiar with it as the work here is only part of the overall plan. In this assessment you develop a short literature review and project specification which is to be approved by a University panel.

You are reminded that this work is weighted and to assess whether you have passed the unit as a whole it will be combined with the statistics assessment in the ratio of 0.7 * Assessment 1a + 0.3 * Assessment 2 where all assessment marks are expressed as a percentage. The overall pass mark is 40%.

Project Focus

The project you write later in the course must be based on the specification you produce here. The project must be coherent with the programme title, therefore, it must be

Research Based – means that you have to collect original data (called primary data) yourself. Primary data is not something you can get out of a book or just download from the internet – it has to be totally original. Whatever you decide with regard to primary data you MUST make sure you can actually get what you say from wherever the data is located.

Strategic Business IT Orientation – the primary data you collect has to be used to generate a Strategic Business IT outcome of some kind.

IT learning – the project must represent significant learning potential in the IT/computing field for you.

Project Style – for this degree only the project style known as "Study" is allowed.

New Work - projects must be new work and you are NOT permitted to use any project material or data that may have been used before on another course or indeed for any other purpose. If it is discovered that previous project work or research material is being re-used it will result in immediate disciplinary action.

Topic Areas

There are no restrictions on choice of topic as long as it can be regarded as Strategic Business IT, however, project ideas in the following areas are very common and unlikely to find acceptance: eBanking, eCommerce, mCommerce, eLearning, IT in Education, Web Site Strategies, Outsourcing, wireless technology and systems, PDA and mobility, simple HCI, Music Distribution, VoIP, HelpDesks, CRM/ERP factors, or simple security/cyber crime. If you feel that you have a novel or new view on any of the above with a hint of originality within a Strategic Business IT framework then you should write to the Research Methods tutor outlining your new idea.

Work Schedule

None of your submitted work will be considered unless you complete the induction check. In addition, you should note that Assessment 1a is made up of 3 parts plus the pre-work. Therefore in summary:

Pre-Work – you must complete the induction checklist (sent to the University managers) and provide a personal profile (see Appendix C) which when ready is sent to Research Methods tutor (Mr Fred Garlick) in a WebCT email. This work must be done by the end of week 3 – if not you work will not be considered for assessment and your registration revoked.

Part 1: Project Approval - Gaining project approval during the first few weeks of the course based on a written outline and this is worth up to 10 marks.

Part 2: Online Tests - Passing the 5 online tests, one of which is set each week for 5 weeks is worth up to 5 marks, one mark for each test passed.

Part 3: Short Literature Review and Project Specification - This is the main Assessment and consists of a short Literature Review and your MSc project specification and is worth up to 85 marks – the mark distribution is discussed later in this document.

Format and Word Limit - The Short Literature Review and MSc Project Specification must not exceed 2,500 words (including the headings) but excluding the reference list and project plan. In the specification if any major headings are missing, any headings are altered, the sequence of headings changed or any headings added or

Submission - When you proposal is ready use the correct WebCT Drop Box and send it to the University. Do NOT send it directly to the tutor unless you have difficulty and there is no time to contact the University. If you send it to the Tutor the University system will not be able to detect a submission and your work will be marked as late and capped at 40% or rejected entirely. You may submit the work any time up to an including the due date. However, it is unwise to submit early as you may then find that subsequent learning makes you want to change what you have written.

Encouragement - You **MUST** expect to go backwards and forwards many times over all this work until you have a concise, coherent and lucid short Literature Review and full MSc Project Specification.

Study References - The Workbook and section references found in the sample Literature Review and sample project specification are to the Student Workbook Pack Release 3.2c.

Purpose - Once you have an approved or permitted project proposal based on part 2 you are allowed to construct a short Literature Review and a full MSc Project Specification which will be marked by the Research Methods tutor and reviewed by a University panel for final approval. If your specification is not approved by the University you will have another opportunity to try again in the next available cohort either with the same title or with a new one.

Part 3. Short Literature Review and Project Specification – Due date 16.3.2007 Value = Up to 85 Marks

There are 5 on-line tests and these will be made available for a short time periods every week for the 5 weeks starting in week 2. For each test in which you score 65% or better you will receive one mark. To do these tests YOU must find out where they are on the WebCT site and make sure you take note of when the tests are available. No exceptions will be made, if you miss any test for any reason you will NOT be able to take it at some other time.

Part 2. Online Tests – Taken at the WebCT published Dates Value = Up to 5 Marks

1. Title –
2. Problem Setting –
3. Presenting Problem Definition –
4. Real-World Target –
5. Research Question –
6. Intended Project Outcome –
7. Design for Collecting Primary Data –
8. Design for Processing Primary Data –

Declaration – I <student name> confirm that I have carefully studied all the Workbook references in constructing this proposal and that what is described here is a new work and is not copied from any source.

Project Proposal (Word Count =)

Here is a blank list of headings to help you formulate your project proposal.

There are no word counts for each heading but it is normal to find that item 7 and 8 are the most extensive as these show whether you have seriously thought about this as a research that is practical.

8. Design for Processing Primary Data – this is the second part of your design and its purpose is to generate the stated project outcome mentioned in item 6. Crucially here, you set out how you will process the structured collection of primary data in order to generate the stated project outcome. See the study project specification sample and associated notes which can be found in Workbook 3 sections 3.3.7 and 3.5.2.

7. Design for Collecting Primary Data – this is the first part of your design to generate the stated project outcome. This part of the design sets out your process for creating a collection of primary data. The core of this process is called a Basic Activity for Generating Data (BAGeD) and it must be stated here. See Workbook section 6.8, 6.9 and the study project specification sample and associated notes in workbook 3 sections 3.3.7 and 3.5.2.

Appendix A. Sample Project Proposal

This is a sample submission for guidance and you should NOT attempt to try to fit your idea onto it as if it were some sort of template in an attempt to reduce the work you have to do - if the tutor believes you are doing that your work will be rejected

The difficult elements are typically to be absolutely consistent and secondly to find an appropriate BAged. By consistency is meant that the whole submission links together and we don't find such things as the project outcome mentioned as X in one place and Y in another or the problem theme starts off as A in under one heading but migrates to B under another. If such inconsistencies are discovered, you will lose marks or be rejected outright.

Project Proposal (Word Count = 412)

Declaration – I Colleen McCullumb confirm that I have carefully studied all the Workbook references in constructing this proposal and that what is described here is a new work and is not copied from any source.

1. Title – Phishing – Preventative Measures

2. Problem Setting – email is a technology that almost everyone uses in the home, at work or on the move. Traditionally, email is a simple one-to-one or one to many message passing technology but it is now offered with enhancements that include voice, video, chat, file passing and file sharing where suppliers are attempting to present a compete communication environment.

3. Presenting Problem Definition - Phishing is identify theft using email where a personal message seeks confidential or private information from its recipient whilst posing as a legitimate request. The intention therefore is to fool the recipient of the message into releasing information which can subsequently be used for fraudulent purposes.

4. Real-World Target – Increase the awareness of computer users about the nefarious activity of Phishing and hence help prevent identify theft occurring and therefore reducing cases of fraud.

5. Research Question – How (interrogative) can Phishing (problem) be reduced or eliminated in order to control the risk of inadvertently releasing confidential or private information and hence incurring loss (target) by looking at typical phishing samples (spotlight) in order to generate some user guidance (suggestion).

6. Intended Project Outcome – my expected form of outcome will a set of guidance notes on effective strategies to use (including examples) in the event of a Phishing incident occurring.

7. Design for Collecting Primary Data – the BAged will be to identify phishing instances. My process will be to draw up a list of known phishing examples and use that to guide me in searching email logs for identifiable incidents.

8. Design for processing Primary Data – once I have the primary data in the form of a collection of phishing incidents I will pre-process that data by classifying them into general types and assessing the associated risk. In order to generate my intended outcome (see item 7) I will for each type on my list construct an illustration and an associated strategy to combat it contained in a set of guidance notes.

Appendix C. Personal Profile

This profile must be sent to the Research Methods lecturer (Mr Garlick) via WebCT in text only message of no more than 350 words (including headings). The University will use this information to guide you in project title submission and selection. The profile will be available to the University panel that approves your specification.

Profile (Word Count = ??)

1. Student No: This is issued by the University

2. Full Name:

3. Job Title: Your current job title (or state unemployed),

4. Company Name: where you currently work (or write none)

5. Company Profile: briefly state that major business of you company (or none)

6. Country: where you currently reside

7. Job Description: describe your core work (if unemployed say what work you would like to do)

8. Area of Expertise: list no more than 3 areas in which you regard yourself as expert

9. Strategic Business IT Project Area: what topic area or areas interest you relevant to MSc project selection

10. Formal Academic Qualifications: list in abbreviated form all your higher level certificated qualifications.

11. Other Qualifications: list in abbreviated form other qualification such as MCE

12. NCC SBIT PgD College Name: this must be the name of the College where you gained your NCC

Strategic Business IT PgD. Please make sure the name is correct.

13. Project Experience: briefly describe the last academic project you completed and any others that are of recent date.

14. Email Address: the one you expect to use for the duration of the course which must be the same as the forwarding address you set for your email in WebCT.

Example Profile (Word Count = 147)

1. Student No: 903210

2. Full Name: James Sheene-Southwood

3. Job Title: IT Project Manager

4. Company Name: BlueBird Systems Ltd

5. Company Profile: bespoke software system in ticketing systems

6. Country: England

7. Job Description: Managing Business Systems Applications Developments including Requirements Gathering, Business Analysis and System Design using Prince2 methodology mainly in the inventory

Management area.

8. Area of Expertise: Project Management practices but I also have some experience in Web based

development and technologies within an IBM AS/400 environment

9. Strategic Business IT Project Area: inventory management in the leisure industries particularly with

regard to entertainment machines.

10. Formal Academic Qualifications: BSc (Hon) Computing, PgD SBIT

11. Other Qualifications: none

12. NCC SBIT PgD College Name: Purpletrain.com UK

13. Project Experience: Last academic project was a Web based ticketing system for a laundry service.

Professionally my most recent work covered Technical Design of a web based invoice processing system

for a UK holiday company

14. Email Address: james.sheene@googlemail.com

Blank Profile Headings (Word Count = ??)

1. Student No:

2. Full Name:

3. Job Title:

4. Company Name:

5. Company Profile:

6. Country:

7. Job Description:

8. Area of Expertise:

9. Strategic Business IT Project Area:

10. Formal Academic Qualifications:

11. Other Qualifications:

12. NCC SBIT PgD College Name:

13. Project Experience:

14. Email Address:

Appendix D. Project Topic Ideas
Some ideas for final Projects and for use in this assessment – you don't have to select one of these they are just to give you a flavour of what you might look at. The list below was written as general ideas but they could always be applied to a particular situation as well.

No two students will be allowed to use exactly the same idea so it is important for you to get started before all the good ideas are selected and allocated.

Security	
1	Anti-forensic tools (eg Evidence Eliminator)
2	Anti-spyware – a business and personal necessity
3	Awareness Training on Internet Perils for Company Staff
4	Beware of online risks – enterprise users engage on riskier online behaviour than home users
5	Business Skills needs of IT Security Officers in Organisations
6	Comprehensive IT Vulnerability Management
7	Cyber spying
8	Data: Lost, stolen or strayed (off site backup storage for tapes etc)
9	Domain name crime
10	EPS (End Point security)
11	Forensic IT an Essential Business Resource
12	Forensic Tools (eg Windows Washer, Privacy Suite etc)
13	Hackers – Looking for fortune not fame
14	Illegal Downloads and business risk/costs/integrity...
15	IP based surveillance systems
16	IT Security Management and its Impact on Business success
17	Organisational benefits of security surveillance
18	Password Overload and Business Security
19	Protecting the desktop
20	Replacement of names and Passwords – What are the security and Usability implications
21	Secure ID Applications
22	Security – the users is his own worst enemy
23	Security in Kiosk installations
24	Security Software interfaces and personal freedoms
25	Security Violation Reporting – How Management Deals with This huge Volume of Data
26	Storage Security
27	The Ethical Hack – A framework for business Value penetration attacks
28	The Insider- Fighting the Enemy within
29	Usability and its trade off with security
30	Usage patterns in Kiosk installations

Project Management	
1	Analyse, plan, evaluate or report on an IT Project
2	Computing industry standards and their impact on business
3	Configuration Management Software in large scale IT installations
4	Define the role of ILS in a commercial sector IT procurement programmes
5	Desktop Lifecycle Management – A new MS Provision
6	Ensuring the IT projects Deliver Business Results
7	Explain the implications of ILS usage in IT installations
8	How important is user acceptance in the utility associated with IT systems
9	How IT can help with Life Cycle logistics in asset Management systems
10	IT and Logistics Management
11	IT Project Management Practice could be improved by the Use of Emotional Intelligence
12	Life Cycle logistics in IT systems
13	Managing IT system integration
14	Report on commercial applications of ILS techniques or philosophies
15	Software Portfolio Management – The Proving Model
16	Software risk management and its implication for IT strategies
17	The requirements gathering process is a major cause of project Management Failures
18	The role of prototyping and user involvement in requirement gathering and proving
19	The role of user training in Requirements gathering

8	Copy write protection for online trade marks
7	Who owns the Internet – A big Company Takeover
6	The role of Learned Societies (eg BCS) in ensuring professional Competence
5	The Role of Ethics in Systems Analysis
4	The effect of Ethical decision-making in the implementation of a Business Information System.
3	IT professionalism is essential for the full development of the industry
2	IT ethics and the economy/business
1	IT and its role in Social Inclusion
Ethics	

7	Storage Area Networks and their Impact on Business Policy
6	SAN and Continuous Data Protection
5	Modern Societies Dependence on Electronic Storage
4	Modern developments in integrated storage management
3	ILM (Information Life Cycle) – Controlling the Data Mountain
2	Entry level SAN and the SMB/SME
1	Data life cycle management
Storage and Data Manager	

21	Web Based operating system – Is there a future?
20	Ultra Wide Broadband – and its impact on business
19	The Paperless Society – an impossible dream?
18	The Effect of dual or triple core processors on worker productivity
17	Speech recognition system increases wider participation rates/increase worker productivity/ etc
16	Sourcing New Technology for enhancing business success
15	Software agent technology and its role in improving search engine performance by profiling usage.
14	Software Agent technology and its future role in mobile computing
13	Software Agent Technology and its use in improving web applications
12	Screen reading Software Efficacy as a solution to enable the visually impaired to use business software
11	RFID in Baggage Handling
10	RFID in a retailing Context
9	Portable PCs and their business future (ie blackDog)
8	PDA Revival – Is there a Business Future?
7	Optimising business functions by sourcing new information technology
6	Keyboards and their impact on system productivity
5	How new technologies related to location commerce might affect business policies
4	High Speed Broadband and User services
3	High Speed Broadband – its business impact
2	Digital Paper – A new Business Tool
1	Content Management systems and their place in a Modern Organization
Technology	

3	The role of IT training in ensuring personal productivity
2	IT training issues and the disabled workforce
1	Company policy on IT training affects user acceptance of IT system
IT Training	

8	The impact of IT on financial service provision has been significant.
7	The effect on Profitability of implementing an IT supported Asset management system
6	Small Business Accounting Software
5	Micro Payments a route to a cashless society
4	Making better IT Investment Decisions
3	IT hardware – A never ending Cost Centre
2	IT and Micro loans in Developing Countries (Grameen Bank and such things)
1	Electronic bill presentment and payment
IT in Finance	

Miscellaneous	
1	Community Technology Previews – A Marketing Strategy or a genuine attempt to communicate
2	Cyber Café – A world of Business
3	High Quality IT systems increases worker commitment
4	Reliance on private computer systems increases the costs of worker stress
5	The computer gadget market and its impact of Business IT
6	The Extended Enterprise (networks of suppliers, eProcurement etc)
7	The impact on worker productivity/morale of removing all personal systems
8	The IP enabled Economy

IT Services	
1	eAuction - The Future of Procurement?
2	Enterprise permeability and the supply chain
3	Impact of IT on international supply chain management
4	Improving Best practice in IT support units
5	Insuring IT based data assets and certification needs (BS 7799 ISMS)
6	IT Service Levels Agreement and Business Strategies
7	IT Service Management and Business Success
8	Outsourcing Document Management
9	Software Maintenance – A company wide strategy for business support
10	Vendor Service and Software Licensing

Exercise

Look at each of these simple supposed problem statements from students and say what faults are evident?

1. My problem is many customer complaints, loss of revenue and managerial weakness.

Fault - no good multiple problems so there is no clear focus and the student has simply done nothing here except offer the most superficial view. With some serious thought this could be corrected and the key problem theme might be about lost revenue for example.

2. My problem is lack of IT training.

Fault - no good because it is a solution since its resolution must be to provide IT training. Obviously, the student has decided what the solution is before doing any research and so in effect misses the problem definition out altogether. Here one if any though had been expended we might have found the problem is about accuracy in data entry, or customer helpdesk complaints.

3. My problem is to find a way to implement a network infrastructure

Fault - no good as this is an activity not a problem object and also it is of course a solution as one presumes that one wants to find a way to implement because of some underlying issue - this is a bit like saying my problem is to find a solution and no one would think that was a useful definition. One must start to ask why one needs to find a way to implement, what has driven you to the point where you realise that this is a solution - here it might have been a problem about user complaints, or excessive network down time.

4. My problem is growth of phone sales in Hong Kong

Fault - no good since this has nothing to do with strategic IT. It is also a bit odd to think of growth as a problem in itself as one presumes that one want growth.

5. The problem identified in the topic is how to solve the large number of customers' enquiries via internet broadband hotline service once the customers call the hotline centres.

Fault - here we are told the problem is how to solve the problem and we have to guess it's something to do with enquiries.

6. The project aims to identify key issues in this field, define areas of current and future research into the field, and prescribe solutions to dilemmas and issues arising, suggesting key areas of research and design, and suggestions as to the future. It will aim to call upon the experiences of those in the workplace, those who develop such interfaces, and the contact of those in academic research into the area, as well as existing studies.

Faults - here we are just given a long list of things to do in the project and clearly the student does not have the slightest idea what the problem is.

7. Organization face to strongest rivals at economy ages that product life cycle is changed extremely fast and lacks a hypothesis into IT infrastructure as handle rapidly changing business model. Finally, organization is inefficient and lacks a knowledge creative a new product and loss a market place.

Fault - here the English is so obscure that it is impossible to figure out what this student is talking about.

8. The problem theme is that the low accuracy of inventory records for existing inventory systems because of out-dated information. Example, querying those old PCs owned memory less than 32MB, the "old" system provided wrong information in such case.

Fault - here the problem is low accuracy although we just has to guess what exactly than means but the student also tells us that the reason is out-dated information. What this means is that there is no research for us to do here because we already know what the answer is and so such a project is worthless.

Exercise – look at these samples sent in by students and write some comments as if you were advising them how to improve.

Student Example 1

1. Title – Password Overload

2. Problem Setting – The organization I worked for has a lot of global business systems that are accessible via the public internet. This is a business need as employees are required to be mobile and to work based on flexible hours.

3. Presenting Problem Definition – Because these business systems are accessible over the internet, strong password policy must be enforced. Company policies require users to change their passwords every 90 days. Newer systems even require passwords to be at least 8 characters in length and must contain numbers, symbols and characters. Under these circumstances, users cannot remember their passwords thereby causing themselves to be lock-out from the system.

4. Real World Target – To reduce the number of lock-outs caused by genuine users. *Why?*

5. Research Question – How can the company develop a method to help genuine users in eliminating users' lock-outs?

6. Intended Project Outcome – The expected outcome will be to derive guidance notes on how to choose passwords that are secure and easy to remember.

7. Design for Collecting Primary Data – I will use BAged to find out the occurrences of lock-outs from the Helpdesk logs. This is achieved through the identification of instances where genuine users encounter difficulties in their passwords.

8. Design for Processing Primary Data – Once I have all the problems relating to password lock-outs, I will break them down by the different causes, confirming them they are caused by genuine users who have forgotten passwords. I will then develop the guidance notes, covering the recommendation of the countermeasures.

Student Example 2

1. Title – Sarbanes Oxley (SOX/SOA) Compliance – the IT automating strategies.

2. Problem Setting – H.R. 3763, also known as the Sarbanes-Oxley Act of 2002, was implemented in the wake of corporate reporting scandals, with the goal "To protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes."

3. Presenting Problem Definition – The Sarbanes-Oxley (SOX) Act affects all public companies whose stock is traded on United States exchanges. SOX impacts public companies in many areas, including corporate responsibility and increased disclosure. Complying with these requirements often strains corporate budgets and demands increased time and energy to implement. Automating compliance with Sarbanes-Oxley regulations has become a critical component of most companies' overall compliance strategies. Since, the financial reporting processes of most organizations are driven by IT systems. Few companies manage their data manually and most companies rely on electronic management of data, documents, and key operational processes. Therefore, it is apparent that IT plays a vital role in internal control.

4. Real-World Target – Increase the effectiveness of implementing Sarbanes Oxley Compliance.

5. Research Question – How to implement Sarbanes Oxley Compliance with IT/IS automation in an effective way?

6. Intended Project Outcome – It is anticipated that this report will produce a clear implementation strategies in an effective way for Sarbanes Oxley Compliance. Some companies' example will be used for data processing and analysis.

This is the first of many examples I will use that are extracted from student work. Invariably there are faults and so I use these to try to show you what must be avoided in your own work.

Unfortunately, it is often true that the faults imply that the student involved has simply not studied with any kind of care the various reference and exercises I have given and so makes silly and obvious errors. However, you must be aware that this is an assessment and you only get one attempt so if you are careless, not really committed and do not prepare properly you will inevitably suffer as far as marks or concerned or if it is really bad you will be told to choose another topic and start again.

When you send in your work it is supposed to be the very best you can do so you have to be aware that it will go before a University panel and they will be only interested in your best work. My comments are show after every required entry, please read what the student wrote and what I have said by way of feedback and learn from that process.

Not accepted (0/10)

This is overall very poor work and has such gross errors in place that it is not worth really considering. Work of this standard is not in any way acceptable and in my view it was submitted without any preparation or thought and such outright laziness will not be tolerated.

1. Title - Sarbanes Oxley (SOX/SOA) Compliance - the IT automating strategies.

Tutor Comment - This is a very common topic area and so I will be looking for something a little new here. The title is quite good but it contains faulty English and the word "the" needs to be removed. However, I am interested in knowing why you used "the" and the implication of it is rather worrying to me as it implies that somewhere there are a set of strategies that anyone can just go and pick up and there are no others available or even possible - which of course cannot be correct so this indicates a lack of serious thought into what is being said here.

2. Problem Setting - H.R. 3763, also known as the Sarbanes-Oxley Act of 2002, was implemented in the wake of corporate reporting scandals, with the goal "To protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes."

Tutor Comment - Here you have ignored what the heading is asking for and simply told us what Sarbanes-Oxley is and though what you say is mildly interesting it is NOT what was asked for. What we are looking for is the setting for the project itself. When required content is ignored like this, what can we conclude: the student cannot understand simple English, he has not bothered to study the references and the examples or he simply has no idea what to write so writes anything that sounds as if it might be right in some way - such actions are not acceptable and are indicative of poor understanding and attitude to setting out your research idea lucidly and robustly.

3. Presenting Problem Definition - The Sarbanes-Oxley (SOX) Act affects all public companies whose stock is traded on United States exchanges. SOX impacts public companies in many areas, including corporate responsibility and increased disclosure. Complying with these requirements often strains corporate budgets and demands increased time and energy to implement. Automating compliance with Sarbanes-Oxley regulations has become a critical component of most companies' overall compliance strategies. Since, the financial reporting processes of most organizations are driven by IT systems. Few companies manage their data manually and most companies rely on electronic management of data, documents, and key operational processes. Therefore, it is apparent that IT plays a vital role in internal control.

Tutor Comment - This is a very laboured as a definition and it is also unfocused, so here we see as possible candidates: corporate responsibility, disclosure, strain on budgets, resources, role of IT? What we have here is not a problem at all but a solution, automating compliance. In my opinion we have a student who has found a solution and is now trying to find a problem to hang it on. He is in fact not interested in the problem he just want to use his solution somewhere, anywhere.

unknown ones can we? Now on its own that would be such a trivial piece of work that it could not possibly be acceptable. He then suggests something called "future analysis" – this I cannot understand – does he mean he will get a particular product from a company that has used it, get their assessment of it or their pre-assessment of it. We simply do not know and frankly, I doubt this student knows either.

8. Design for Processing Primary Data - As long as I have the primary data, I will separate them into different types since they comply different code components of Sarbanes Oxley Compliance. To successfully create my intended outcome, I will construct illustration strategies and produce report on efficiency on different kind of products and their compatibility for the companies.

Tutor Comment – recall here that the intended outcome is implementation strategies. But all we know for sure is that we have a list of products so I cannot see, and we are not told how, we go from that simple list of products to these illustration (what does that mean) strategies as well as report on efficiencies and compatibility. This is just rubbish.

I. Title: Document Management Strategies

Show the problem set

II. Background: Documents are the lifeblood of an organization. Vital information for the organization is contained in these documents so their sound management is an important concern. Companies have their own storage and retrieval systems, although most are largely paper-based.

III. Presenting Problem Definition: Document management system (DMS) is the

computerized management of electronic and paper-based organizational documents. Despite of the inroads of information technology, traditional DMS still persists. Traditional filing systems have always been regressive and inefficient.

Craine (2005) also pointed to the fact that the DMS is not a panacea that would bring about a paperless office (Porter-Roth, 2006; Craine, 2005).

However, adopting an efficient and effective DMS does not come easy as resistance to it is also present. This includes investment considerations, security, and the flawed notion that DMS is the panacea that would bring about a paperless office (Porter-Roth, 2006; Craine, 2005).

III. Real World Target: Inform businesses of the merits of instituting an effective and efficient DMS manifested in reduced required time for data retrieval and store data and heighten security.

IV. Research Question: "What are the bottlenecks and areas for improvement in existing document management practices where strategies can be adopted towards a more efficient DMS?"

existing document management practices where strategies can be adopted towards a more efficient DMS?"

X

X

Deadline/Review with the Doc

V. Personal Theory: DMS is the integration of technology and management

systems custom-fitted to suit organizational needs. Researcher is convinced that DMS exhibits enormous potentials for an organization in the area of documentation handling and safekeeping.

VI. Intended Project Outcome: The intended project outcome is a discussion of

best industry approaches to DMS. The study will ascertain the variables or forces

that can spell the success or failure of an organization's DMS. Tried and tested procedures and best practices in DMS, from registration, distribution, filing, querying, retrieving, loaning, transfer and purging of documentation will be illustrated. The

appropriate transition from a conventional to a modern DMS shall also be tackled.

VII. Strategic IT Value: DMS is undoubtedly one of the most profound

technological breakthroughs that impact greatly on organizations. It spurs efficiency in document treatment and facilitates quick access to large amounts of information.

VIII. Design for Collecting Primary Data: Researcher would look into the

document life cycle to find areas where bottlenecks and complications arise, utilizing existing documents and interviews with key people in the organizations which will

serve as the primary data.

IX. Design for Processing Primary Data: A matrix that would match the

bottlenecks identified against best practices researched will be provided. A

Document Management Guide that any organization can readily use will be the

culmination and end goal of the study.

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Student Workbook Pack

Research Methods for Master's Students

School of Computing

CN.002 Release 3.2c December 2006 ©

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1. WORKBOOK 1. MASTER'S PROGRAMME OUTLINE

The Master's programme has two units of study: Research Methods and Project and the online programme notes together with this workbook pack cover all the information you need to complete it.

1.1 University Expectation

The University expects that when students submit work it is the very best they can do. In practice this will mean several things and all of them will be examined when work is assessed.

English – written English must be of a Master's standard and that means an IELTS score of at least 6.6 (or equivalent) is needed. If submitted written work is judged to be below this standard, students will NOT be allowed to progress to the project stage no matter what their actual language certification states.

Structure – work must be well structured and coherent. In practice students will most often work with a pre-defined set of headings and they must be used explicitly without deviation in their implied content.

Preparation – good work can only be produced if there has been adequate preparation. This will mean a thorough study of any and all references and exercises. Study does not mean a quick read through the notes or academic arrogance which says "I don't need it" or "I know all this stuff". This preparation also means working through the topic idea itself so that one becomes expert in a particular field.

Instructions and Guidance – all the work you submit will have to meet various standards in terms of layout and format and students are expected to following such guidance diligently.

Using other people work – all work submitted must be the student's own but within that work they may refer to the work of others but all material used must have proper attribution. Thus, if another author's work is copied, paraphrased or summarised it must be properly cited. Students need to understand that paraphrasing (putting things in your own words) and summarisation will amount to plagiarism if not properly attributed. This is a very serious matter and the rule with regard to copying is very simple. If 6 or more words are copied then the sources must be cited and if 10 or more words are copied without attribution then that is regarded as proof of plagiarism

Student's Own Work – the submitted work must be entirely constructed by the student and to do this it is necessary to weave into ones own ideas and thoughts the work of others. One may use the work of others to lend support to a proposition, or to include a definition or an explanation and so on. In other words it is not so much a question of how much of another person publication one uses but what one does with it in constructing ones own research work. In short scholarship is acknowledging and using the work of others whereas plagiarism is using the work of others and in so doing attempting to fool the reader into thinking it is ones own.

Respect – when writing one is doing it for another person to read and it's therefore a grave sin in those circumstances not to offer the very best one can produce.

Need - only quote, paraphrase or summarize when it is clearly adds to what one is saying and it is not just common knowledge or obvious. The key task is to formulate ones own ideas, in your own words by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

1.2 Overview of Unit Assessment

The two units: Research Methods and Project are assessed separately and students must in each one gain at least a pass grade in order to qualify for a Master's award. The assessment artefacts are.

Research Methods Unit (15 Credits)

The Research Methods Unit will be taught over approximately 12 weeks and assessment details will be published to you early in the Unit. The assessments are as follows.

Assessment 1a - development of a project specification plus a short literature review

Assessment 2 - a coursework on statistics.

Project Unit (45 Credits)

The Project is an extended research exercise where students will be guided by a personal supervisor. For students who have passed assessment 1a, approved projects will start a few weeks after the end of the Research Methods Unit and last for at least 18 weeks. There is only one assessment as follows:

Assessment 1b – prepare a full research based project document based on the specification developed in assessment 1a. The details of what is required in the Project itself can be found in Workbook 9.

1.3 Research Methods Unit Assessment Overview

This unit of study requires about 150 hours of effort from each student and will cover research principles, research ideas, research techniques as well as statistics. Assessment details and due dates will be made available early in the study period for the Unit in WebCT.

1.3.1 Assessment 1a – Preparation, Literature Review and Project Specification Development

The first unit event will be related to the development of a project specification and is in two stages.

Part 1 – Project Proposal Approval (up to 10 marks) – when the Research Methods unit begins students need to gain approval for a project title/idea. The university will supply a list of ideas or students may bring one of their own as long as the related project outcome has a strategic business IT dimension, it is new work, it involved learning in IT and it is a Master's level activity. In the approval process students have to write a short submission to a set format and send it in a plain email to the Research Methods tutor whose decision is final. This process must be completed by the due date set in the Assessment 1a papers (normally about week 6)

Students are permitted ONE attempt to gain marks in each cohort at this stage and one of three outcomes is possible:

Approved – the submission, whilst not necessarily being perfect, meets all the above project criteria and the outline is judged good enough for the student to begin work on the specification. About two weeks after approval is granted a supervisor will be allocated who may assist you in finalising the project Specification.

Permitted – the submission has a suitable idea but its construction is judged to be of poor quality but the student is given the benefit of the doubt and is expected to make good in the specification. No supervisor will be allocated and final approval will be depended on the quality of the final specification.

Rejected – the work is received after the due date or submission does not meet the criteria for a project in this degree and a new topic must be chosen and a new application made. Most often this is because there is no Strategic Business IT, the project research is regarded as trivial or plagiarism is detected.

Part 2 - Online Self Tests – these will be available at set times for a set duration every week for the first 5 weeks. Typically 1 mark will be awarded for each test in which you score 65% or better. Students should note that missing any test for whatever reason means the recorded score will be set to zero automatically as there is no provision for taking the test at another time or by another method.

Part 3 – Short Literature Review and Specification Approval – based on an approved or permitted project proposal students prepare a short literature review and full project specification which must be posted into a WebCT drop box on or before the assessment due date. The Research Methods tutor will review the work and write a feedback report for each student. The specification and feedback report will then be placed before a University panel who will decide whether it is appropriate for a Master's level project. At the end of the specification approval process one of four outcomes is possible:

Approved – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Approval will not mean that a specification is perfect and it is expected that students will take note of any feedback given by the Research Methods tutor or the allocated supervisor to further refine it.

Approved Conditionally – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report. Conditional Approval means that there are some significant concerns that must be addressed before work begins and students are expected to redraft their specification, based on feedback given by the Research Methods and in discussions with the allocated supervisor.

New Topic – this means that a student specification has been rejected in its entirety and another topic must be chosen and work must begin again by seeking approval for the new topic before writing a new specification for submission in the next available cohort. This action is most often used when the University decides that the work is trivial, or the work has no significant IT content, or the student has submitted a specification without gaining approval for the topic, or plagiarism is identified.

Plagiarism is Identified – no approval is given and the relevant student work is subject to review by a disciplinary panel. Plagiarism is a form of deliberate deception in order to gain advantage and will always be treated with the utmost seriousness and may even result in students being dismissed from the course.

1.3.2 Assessment 2 - Statistics Coursework

This is usually a set of questions and mainly deals with quantitative data. The submission date will be published to you.

1.3.3 Calculation of Research Method Unit Mark

The overall mark for the Research Methods unit will be calculated as a weighted average for assessment 1a and 2 with the actual calculation being $0.7 \times \text{Assessment 1a percentage mark} + 0.3 \times \text{Assessment 2 percentage mark}$ in which a pass is indicated by scoring 40% or more overall.

1.4 Assessment 1b - Master's Project

This unit of study requires about 450 hours of effort, guided by a University appointed supervisor and based on the specification developed earlier in the programme. The actual project document must be supplied in the form shown in section 9 of these notes and is expected to be of about 15,000 words maximum (excluding appendices).

Once allocated a supervisor, students will be asked on what date they wish to submit their project. The only rule regarding project activity is that it must last at least 18 weeks and no more than 2 years but it will be a matter for students to negotiate with their supervisor and the University to agree a submission date. Students are allowed to make small changes to the specification during the project process but they must be approved by the supervisor and must not amount to a change of the topic that was approved.

2. WORKBOOK 2. RESEARCH METHODS CHAT AND STUDY PLANS

This is a general plan for study for this course. Chat sessions are important because they are collective and interactive and typically focus on just one important feature of research and to get the best out of the course students need to prepare properly. That means reading the notes, doing the multi-choice tests that go with each chapter, studying the Workbooks and contributing if you can to the discussion boards.

2.1 Contact Mechanism

Contact with students is through email, discussion boards or chat. Email is very important and you should ensure that you use an Internet based service so that you can get mail almost anywhere. It is good practice to create an email account just for the duration of the course and a common choice is GoogleMail because the storage space is, for all practical purposes, unlimited. If you are not able to create a GoogleMail account let me know and I will send an invitation to you. It is important that only ONE email account is used for communication and that address is made know to the Research Methods tutor as follows.

Whatever, mail system you use it is advisable to set mail forwarding from both your WebCt accounts to your personal one to ensure that you get mail as soon as it available. It is also useful if students have a Skype or IM account as many tutors allow direct access if they are online. Skype is preferred since chat, voice and video are all catered for and during contact one does not get bombarded with advertising. Internet email services vary considerable but my recommendation is that you only use a service that:

- Provides a virtually unlimited storage capacity
- Guaranteed to work from almost any location: hotels, Airport, etc
- Allows you to set a mail forwarding address (most services do not so check this with care)
- Provide quality SPAM filtering, virus checking and is not on the SPEWS blacklist
- Allows POP redirection (so you can use Outlook and send from databases etc)

2.2 List of Workbooks Sections Available

Here is a list of all the workbooks in this pack. Students must read them as the course progresses and tutors will expect a committed familiarity with what they say.

No	Workbook Name	Comments
01	Master's Course Outline	General overview of course and assessment structure
02	Research Methods Chat and Study Plans	Lesson plans for the chat sessions and student study plan
03	Project Specification Notes and Examples	Shows what a submission should look like with some helpful hints
04	Sample Literature Review and comments	Shows what a submission should look like with some helpful hints
05	Literature Reviewing	Guidance on constructing a review
06	Major Project Elements	Notes on writing a clear aim and a set of corresponding objectives
07	Basic Research Methods Checklist	A list of several possible research methods for quick reference
08	Bibliographic Referencing Harvard APA	Notes on how to use and cite source literature
09	Writing Up a Research Project	Sample content outlines on how to write your project document
10	Project Submission Form	A checklist to use before project submission
11	Marking Form Study Format	A copy of the form use to grade your project submission for reference
12	Marking Form Engineering Format	A copy of the form use to grade your project submission for reference
13	Project Mark Reconciliation Form	A copy of the form to reconcile marks when markers cannot agree
14	Supervisor/marker notes and grade criteria	Use by supervisors and markers to assess project work
15	Unit Level Feedback	Form that allows you to give feedback on each unit you study
16	Research Methods Master Notes	Complete course notes as a pdf file (not in this pack)
Table 1. List of Workbooks		

2.3 Complete Study Plan

Students must work in a committed way for the 12 weeks during the Research Methods unit and submit the work required on the set dates – there will be no extensions given other than for sickness or other indisposition (in which case students need to complete an ECF and provide documentary evidence of incapacity). Failure to deliver on time without permission will mean that the student unit result will be recorded as a fail. For the whole course the timings in hours are approximately as follows:

Course Element	Time	Comments
Chat Sessions	25	Including preparation and summarizing the chat log
Regular Visit to Site	25	For email and discussion board
Study Notes/Text Book	35	Including making notes and doing the tests
Preparing Submissions	65	Including reading the relevant workbooks and topic details
Table 2. Overall Research Methods Unit Study Plan		

2.4 Recommended Timings for Completing the Research Methods Work

Please look at the following list of times for preparation and carefully plan a way through this unit using these estimates.

Course Element	Time	Comments
Statistics Questions	20	There will usually be 4 questions for you to work through.
Literature Searching	10	The key to a successful submission of the assessments is that ones mind is fully prepared with all the knowledge needed.
Task Description	5	Here students prepare a project proposal: the research question, the form of answer expected, the Basic Activity for Generating Data, data specification and decision on a research method.
Project Idea Approval	5	The format used for this can be found in the Assessment 1a description
Research Plan	5	Here students prepare a plan for collecting primary data. This is not literature searching, it is new and original research
Short Literature Review and Project Specification	20	A partial short literature review and comment is provided in Workbook 4. The Project Specification format is presented in Workbook 3.
Table 3. Coursework Submission Plan		

2.5 Recommended Five Week Development Plan

In this course students must write a project proposal as soon as possible using the format set out in Assessment 1a. However, the basic project idea must be developed and refined carefully and typically it will be done in the sequence shown in table 4 where items in blue are specific to Engineering and items in red specific to study projects. Typically this refining process start is week 3 of the course

There is NO short cut in this work and the standards are very high. The expectation is that you will read and study the notes, examples and exercises with dedication and care. Failure to study with care is usually obvious in the quality of the work prepared, so work hard and think through carefully all the steps below – there is NO substitute for thinking your own idea through. There are plenty of examples to guide you but these examples are not templates they are there to help you gain understanding and not as some sort of quick fix to the work.

If the University sees in your work that all you have done is copy the example substituting a few words here and there then it is very likely your submission will be rejected. The University is looking for students who are thoughtful and careful in their work and through a process of hard work each student must demonstrate commitment high standards – nothing else is acceptable.

Week	Work Recommended
2	<p>Topic Area Research – this is about thoroughly understanding the topic area in which your problem is set. For example, if one was looking on Inventory Management using IT in a fast moving retail environment. that is where your literature research efforts are to be directed. So one would look at inventory management itself, warehouse based systems, shop shelf systems, POS systems, tracking fast moving but small value items, restocking, forecasting, re-ordering and so on. The idea is that you take time to think of all the aspects of the topic and then you try to become knowledgeable in them. There is no short cut here and the work must be done thoroughly and with commitment.</p>
3	<p>Presenting Problem Definition – every project will be based on a real-world problem of some kind. Student must define the problem as accurately as possible and that will be the theme of this first work element. Notice the intention is to have just ONE problem definition. (See Workbook 6 section 6.2 and 6.5)</p> <p>Target – this is the intention of solving the problem itself – that is what real-world benefits will result. For example, the problem might be about accuracy in inventory records and that would imply that if we can find a suitable project outcome that can be used to alleviate that situation then it will results in the target of for example reduced inventory costs. Problem and target are two side of the same idea. (See Workbook 6 sections 6.3)</p> <p>Research Question – here one tries to encapsulate the problem definition and ones theorising into a concise and lucid question that will form the focus of the research effort. (See Workbook 6 section 6.7 and 6.9).</p> <p>Theorizing based on the problem Theme – here one theorises about possible causes of the problem and corresponding solutions. In the case of inaccurate inventory records we might theorize solutions as being based on: production of a training plan for staff, feasibility report on possible use of technology, development of a sales policy and so on.</p> <p>Project Outcome Form – during theorization choose what might be regarded as a best solution and this becomes the single outcome intended for a project. For example, if we take the problem mentioned above of inaccurate inventory records then a project outcome could be a feasibility report on the use of RFID as this might be seen as a way of solving/partially solving the stated problem. (See Workbook 6 section 6.4 and 6.7)</p>
4	<p>Primary Data Definition Outline – the primary data definition is affected by means of the BAGD and it needs to be focused on the problem definition and the expected form of answer. (See Workbook 6 section 6.6, 6.8 and 6.9) In Engineering projects the outcome will be an application of some kind and that needs to be described.</p>
5	<p>Aim and Objectives – in the aim and objectives you sharply focus ones project by stating the means whereby one gets the major project outcome by a series of minor ones in order to achieve the project real world target. Of particular significance here is that the distinction between a project outcome and a project target is thoroughly understood. (See Workbook 6 section 6.11)</p>
6	<p>Research Design – this is the core of any project and it is the place where one expects to see serious and consistent thinking about how the presenting problem is to be resolved by collecting and processing primary data in order to generate the expected project outcome that will eventually lead to a real-world benefit called the project target. There are three elements as follows. (See Workbook 3 section 3.2, 3.3, 3.4 and either 3.5.1 or 3.5.2 as appropriate)</p> <p>1. Research Method Selection – this is an overarching framework used to guide and control the research effort. There are many Research Methods and it is necessary by a process of logic based on ones Research Question and it primary data needs to select and justify a suitable method. For Engineering projects the research method is focused on collecting application requirements. (See workbook 7)</p> <p>2. Design of Primary Data Collection Plan – based on the Basic Activity for Generating Data which focuses on the core data needed and then that basic activity surrounded by a process that allow reliable collection of the primary data. (See Workbook 3 section 3.5.2). For Engineering projects the plan is based on the outline application proposal which focuses on the core requirements and outlines a process or processes that allow reliable collection of the requirements. (See Workbook 3 section 3.5.1)</p> <p>3. Design Primary Data Processing Plan – with a collection of primary data in some suitable form one can apply some processing to it in order to arrive at the expected project outcome. Typically this might be statistics if the data is quantitative, various forms of text analysis or diagramming if it is qualitative. (See Workbook 3 section 3.5.1 or 3.5.2)</p> <p>For example, if one conducted a survey on the effects of SPAM on personal productivity then this might have been done with a questionnaire with say 20 questions. Now processing each question and drawing charts and graphs is NOT the same as explaining the effects of SPAM on productivity – to do that one must consider the whole survey where each question would be a dimension of the problem space. It follows that typically one pre-processes the data collection in some way and later using the results of that pre-processing we further process the data to get the intended outcome</p>
Table 4. Specification Elements Work Plan	

2.6 Critical Reflection

Students must expect to go back and forth over their work because as knowledge and understanding grows one will inevitably see that some of one's earlier work was incorrect or not as clear as it could be or maybe it can be improved in some way. This revision strategy is very important as a common fault with research work is that it often lacks consistency because there was no serious reflection on earlier work.

2.7 Chat Session Profiles

The following is a simple guide as to what students will be covering in the online chat sessions. These sessions are extremely important as they are usually interactive and are based on using examples. The research Methods Unit will involve a chat session roughly once every week – half these sessions will be based around the notion of research methods and half based on statistical processes.

2.7.1 Chat Session 1 – Setting up a Project?

This chat session will be a discussion of what is meant by research. The chat will focus on the idea of a presenting problem, target and outcome as the basic project building blocks. From this the chat will move to discuss a framework to surround a research project and a look at some of the core techniques that must be mastered. To prepare for this chat read Workbook 1 and 2 and Workbook 6 section 6.2 to 6.6.

2.7.2 Chat Session 2 – Refining a project Idea?

This chat will take the form of a discussion on how a project idea is explored and focused and a full example will be used followed by an open discussion and questions from students.

To prepare for this chat, students should be familiar with the title approval format shown in Assessment 1a and the specification examples and notes shown in Workbook 3 sections 3.5.1 and 3.5.2. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea. Of particular concern in this chat is the notion of presenting problem Workbook 6 section 6.2 and form of answer (project outcome) in Workbook 6 section 6.3 and 6.7, Basic Activity for Generating Data Workbook 6 sections 6.8 and 6.9. Students must work hard on these three ideas if they are to form an acceptable project specification.

2.7.3 Chat Session 3 – Research Method and Research Designs

In this session a research design will be developed based on a personally developed problem definition, research question, form of answer and Basic Activity for Generating Data. To prepare for this chat students should be familiar with the title approval format shown in assessment 1a and have studied the specification examples shown in Workbook 3 sections 3.5.1 and 3.5.2 as well as the associated notes in section 3.1. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea.

2.7.4 Chat Session 4 – Literature Reviewing and Working in a Scholarly Manner

In this session some examples of student work and how they write down their ideas will be examined based on scholarly principles. This will be followed by looking at a process that applies equally to what one writes and what one reads. The remainder of the chat will examine several excerpts from student work that exhibit common faults. To prepare for this chat read workbook 8 on citation styles and bibliography, chapter 4 of the notes and Workbook 5 and it might be useful to read through the sample short Literature Review in Workbook 4. In addition, it will be useful if one look at one's own way of using primary source materials and find some examples that are good and bad.

2.7.5 Chat Session 5 – Aim and Objectives

This chat will focus on how to write an aim and a set of objectives based around a problem definition and a Research Question. To prepare for this session read Workbook 6 sections 6.11 and Workbook 9 section 9.6.3 but also consider one's own project idea and what might be suitable in that case.

2.7.6 Chat Session 6 - Open

This chat will look back over the course and typically review faults that arose out of the assessment of the project specification. This will be supplemented by a discussion as to how various project elements: title, research question and Basic Activity for Generating Data, aim (not aims) and objectives are constructed but focused on the basic Activity for Generating Data.

2.7.7 Extra Chats - Open

Normally, each week there will be an open chat on Sunday at 1400-1500 where students may bring their questions, comments, concerns or grumbles. These are useful sessions but only when students come prepared with items that they need to discuss. These are not teaching sessions so the tutor will have nothing to say unless students come prepared with questions and are willing to participate.

3. WORKBOOK 3. PROJECT SPECIFICATION NOTES AND EXAMPLE

This section contains some guidance notes and sample completed project specifications - please consider them carefully. Do NOT copy them blindly – they are just for guidance and students must write their own in a way that matches what they want to do. The aim of the specification is to state a project plan as clearly as possible so one needs to be concise and precise.

3.1 Project Styles

In projects two styles are commonly found. There are some restrictions on these two forms depending on what programme you are on but the Tutor will advise on that issue. Briefly the two styles are as follows:

Engineering – here you design and build a software application, create a system design etc.

Study – here you design a research program to collect primary data in an attempt to find an answer to an interesting question. For example, one might investigate whether cascading styles sheets lead to simpler accessibility or you might evaluate the role of email management in business success.

3.2 Specification and Design

The following notes and samples for project specifications may help you prepare your own. However, it is important to think of it as being primarily a design for your project. The specification is essentially in three parts although it is not presented in exactly this sequence:

Preparation – this is not explicit in the specification but implies that you have thoroughly reviewed the literature at least to the depth of feeling confident that you know enough about the project topic to define and gather data. Implicitly, the University will look at your use of the literature and reference list to assesses how prepared you are for this work at this level and on this topic.

Background – this is about you setting the scene and defining a problem and then focusing on that problem with a Research Question, aim and a set of objectives.

Research Design – this is the culmination of the specification where you set down your detailed design for defining, collecting and processing primary data to get your stated form of outcome. It is very important to realise that this is a design and without a sound design things are likely to go very wrong.

In summary, one needs to think of the whole processes as starting with a problem definition and ending with a solution (your project outcome) and the element that connects these two things is your research design. It follows that unless you have a good design you will not be able to get from your problem to your outcome and that will mean your project fails.

3.3 Project Specification Headings and Formatting

All the following main headings and subheading must be used and students must not introduce others. As these guidance notes are read it is advisable to also look at the relevant examples in section 3.5 so that one can clearly understand what is being said.

3.3.1 Specification Header

Make sure all your details are entered correctly otherwise work may be misfiled or rejected because we cannot ascertain whose work it is.

3.3.2 Project Title Construction

Project titles must make clear sense in English and not be overlong. See Workbook 6 section 6.13.

3.3.3 Specification Intention

This element is to be a simple statement regarding whether there is an actual real world client for the outcome of this project or if it has some other purpose.

3.3.4 Project Task Description

The main function of this section is to explain what is going to be done using the suggested headings below and as shown in the sample. The headings are intended to be precise and if students ignore or change them or use them for any other purpose the work will be rejected. The actual selection of headings will depend on the type of project: Study or Engineering.

Engineering Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct an Engineering project task description and must expect to go over them many times before a concise and useful description is formulated. For Engineering projects please note that a functional description means that one says what the application will do for the users and not how it might be built or what architecture is involved.

Situation Overview – express here a concise and high level description of the existing or proposed application area.

Presenting Problem Definition – a concise definition of some real world problem related to data processing of some kind. This is an important step since unless one can clearly see what the problem is then any solution suggested may be deficient in some way. In most cases the problem definition in engineering projects is related to elements such as data availability, searching, access speed, storage, processing, accuracy, sharing, reporting, entry, updating, deletion, control, security, volumes, segregation, consistency, worker efficiency, process systematization, communication and so on. For the purposes of writing a specification the expectation is that students will focus their problem definition on one major aspect of the application scenario. See Workbook 6 section 6.2 and 6.6.

Real-World Target – a summary of the real world effects that are expected if this problem can be solved or partly solved.

Application Proposal – expressed as a concise description of the main system functionalities. When describing the main functionalities it should be done at a high level and it is recommended that they are all coherent and there should be no more than 10.

Ethical Overview – express here a concise review of any ethical impacts of gathering the primary data, processing it or system usage.

System Architecture – a concise description of the major or main architectural elements of the proposed application

Strategic Value – expressed as a concise argument that the application is able to deliver to the stated problem definition.

Study Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct a study project task description and must expect to go over them many times before a concise and useful description is formulated.

Project Topic Area Overview – a concise description of the topic area aspect being covered.

Situation Overview – a concise, high level description of the context in which the research is set.

Presenting Problem Definition – expressed as a concise statement of the single underlying problem leading to this study. This is an important step since unless one can clearly see and define what the problem is then any solution suggested may be deficient in some way. Study projects look at an aspect of strategic business IT and that might cover technology effectiveness, IT investment, user acceptability, development or improvement plans, feasibility studies, legacy systems and so on. See Workbook 6 section 6.2 and 6.6.

Real-World Target – what desirable real-world benefit is likely if the stated problem can be resolved or partially resolved. (See Workbook 6 section 6.3)

Research Question – expressed as a concise question that captures the problem definition and the real-world target. See Workbook 6 section 6.7 and 6.9.

Personal Theory – expressed as a concise and focused rationale regarding what an answer might be to the Research Question. See Workbook 6 section 6.5.

Intended Project Outcome – write a concise statement that expresses the expected major project outcome as it arises out of the stated problem definition and your personal theory and would be an answer to the Research Question. See Workbook 6 section 6.4, 6.7.4 and 6.9.

Strategic IT Value – here it is necessary to discuss ones intended project outcome and show that it is or leads to a Strategic Business IT impact that could eventually resolve the stated problem definition and hence generate a Strategic Business IT value. See example in Workbook 4.

Ethical Overview – a concise review of any ethical impacts of gathering the primary data, processing it, presentation or usage of results in the form stated

3.3.5 Overall Project Aim

This is a vital point in the specification because in a very concise manner a researcher brings together in one aim: the main project **activity** to get a stated project **outcome** as well as telling us what **data** is the focus of the activity and finally what the purpose or **target** for the project outcome is in relation to real-world problem resolution. It is essential that you fully understand these four elements as described in Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3.

3.3.6 Set of Project Objectives

To meet an overall aim it is necessary to achieve a number of milestones indicated by a set of objectives generating minor outcomes. Objectives can be hard to write and it is expected that there would be between 3 and 6 of them. See Workbook 6 section 6.11 and 6.10.2, Workbook 9 section 9.6.3.

3.3.7 Research Design

The Research Design is about the core elements that generates primary data and processes it into the form of answer expected (your project outcome). The Research Design is divided into two phases.

Design for Collecting Primary Data – a process or processes used to define and create a primary data collection. It has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the actual data and present that data.

Design for Processing Primary Data – a process or processes used to manipulate the collection of primary data to get the form of answer expected.

A useful analogy for a Research Design is that it is like deciding that you want a sponge cake and then working with a shopping list (a list of primary data that you want) to collect a bag of ingredients (collection of the listed primary data). Once we have our ingredients (primary data) we use a recipe to prepare and mix them (pre-processing the primary data) ready for the final processing step to bake the cake (like generating your form of answer). To reverse the analogy, if you were going to make a cake you would not walk into a shop and just pick up a random set of ingredients and then mix them all together into some muddle, bake it and expect a cake to emerge - no one but an idiot would do that would they?

The suggested headings to use are as follows and you are recommended to use them carefully in a step by step manner to construct a research design. You must expect to go over them many times before a concise and useful design is formulated. In the examples I have added the step numbers for clarity but you do not have to do that in your own work as long as all the elements are present.

Engineering Projects Research Design Format

Research Design Phase 1 – Requirements Collection Process

This phase is concerned with a process that generates a reliable collection of primary data which in an engineering project will be a set of requirements. See Workbook 7 section 7.10.

Define – here one bases the definition of requirements on the outline proposal document.

Location – state where or from whom the requirements can be found.

Collection Protocols – here it is necessary to select appropriate collection protocols such as: interview, observation, records searching and so on needed to collect the requirements under the standard four headings: Functional, Non-Functional/Performance, Technical and Usability. See Workbook 6 section 6.6.1.

Requirements Presentation – the requirements data once collected will typically be presented as interview transcripts, notes and copies of documents and lodged in the project document appendix as a kind of requirements catalogue.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulate it to get a design for the application. This is in two sections.

Overview – show how the various requirements are expressed in a design.

Specific – in any design there will be aspects that have no obvious means of expression and such aspects are typically written as a list.

Study Projects Research Design Format

Research Method – make a selection and write concise rationale for its use. See Workbook 7.

Research Design Phase 1 – Primary Data Collection process

This phase is only concerned with generating a reliable collection of primary data and is based on the Basic Activity for Generating Data but to be it has to be surrounded by a complete process.

Basic Activity for Generating Data – a concise description of the activity that forms the core of the primary data collection process. See Workbook 6 section 6.8 and 6.9

Primary Data – outline primary data items to be collected. See Workbook 6 section 6.6.

Location – a concise description of where the primary data may be found. In practice it may come from almost anywhere including extraction from existing secondary sources.

Collection Protocol – a concise description of the actual collection procedure which may be based on one or more of the following: interviews, questionnaires, observation, roles playing, document analysis and so on. See Workbook 6 section 6.6.1

Primary Data Presentation – expressed as a concise description of the way in which the primary data will be presented.

Research Design Phase 2 – Processing and Presentation

This phase is only concerned with a processing the collection of primary data in order to get the expected project outcome.

Design of Pre-Processing for Primary Data Collection – concise description of the processes applied to the raw primary data collection to generate a refined collection of primary data structured in a fashion that makes it suitable for generating the intended project outcome. (Workbook 6 section 6.6.3) (Please note that this step will not always be needed)

Design for Primary Data Presentation – presentation of data collection generated from the pre-process step - if that step is not needed just a presentation of the primary data.

Design for Generating the Intended project outcome – here the primary data collection (pre-processed if necessary) is used in some algorithmic or heuristic fashion to generate the intended project outcome.

3.3.8 Logistics and Tools

In this section the practicalities in terms of tools and time need to be considered. It is only necessary here to state things that are specific to this project, so it is not required to say things like: the library, Word, Excel, paper, pen, SPSS and so on as these are common and almost always available everywhere.

3.3.9 Outline Content List for your Project

This should be detailed enough to ensure that there is a clear idea of the final structure of the project document. Please be careful with the essential elements as indicated on the marking forms since if they are omitted a significant number of marks may be lost in the final project. See Workbook 9 table 6 and section 9.3.5 where typical chapter and section headings can be found. Workbook 11 or 12 (marking forms) need to be consulted so that no essential elements are omitted

3.3.10 References

This section is used to assess how well a student has prepared for the project activity. The University will want to see that the reading is current, comprehensive and focused on the topic area. It is expected that work in the specification will be supported from the literature particularly in the outline description and research method sections. Unless the literature is seen to be used in the various sections of a project specification it may not be approved although it is not expected that one cites from every book in a reference list. See Workbook 5 and Workbook 8 and make sure citations are in the Harvard APA style.

3.3.11 Project Plan

The plan must be developed by looking at ones contents list and considering what activities are necessary to generate the various project objects. Aim for around 12 to 20 activities lasting at least 18 weeks with any suitable start date. A project activity is something that is significant and requires planning and monitoring. So for example:

Prepare Metric Program – this is clearly a significant activity that has to be planned and monitored and so properly part of the plan

Select an Organization – this is an activity and might be important but it is doubtful if there really is a significant process involved here that has to be planned and monitored.

Outline Implementation Plan – this is not an activity so should not be in the plan.

The University will examine each plan and will want to see that it is focused on the project – the implication here is that it should be possible to see that a given plan supports a particular project idea not juts a copy of one of the samples or is so generic it might apply to any project.

3.4 Testing Your Research Design

A design must amount to a logical plan that takes a problem definition to a description to the expected outcome that will resolve the stated problem. The following are a useful check that a plan is sound.

Practicality – consider whether one has the resources to be able to carryout a plan. This is a very serious step and must not be taken lightly. It is all very well to have an elaborate plan on paper and to think because it all sounds logical that it can actually be done. In many cases a crucial test of practicality is to be sure that one can get the data from the locations specified.

Credibility – here one is expected to be honest and decide whether the plan will result in useful data and outcome. It is unfortunately true that many research projects end up being trivial because of poor identification of data and more importantly the choice of appropriate collection protocols. It is also worth considering the data processing functions as they must also be credible.

Confirmability – this test is about what would happened if the same research was done a second time with the same data – would the researcher end up with the same answer. To put it another way, is the processing method too dependant on an individual and that dependence may lead to bias.

Trustworthiness – here we are concerned that the conduct at all stages is such that one could have confidence that the results are genuine and not manufactured.

3.5 Example Specifications

Here are some sample specifications, they are complete except for the contents list and project plans but they are not meant to be copied without any conscious thought and any obvious attempt to do so will result in specification rejection.

3.5.1 Example Complete Engineering Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – the customer is SIS and the application is expected to go live by June 12, 2006.

Project Title - An Assessment Marks Processing Application. (See Workbook 6 section 6.13).

Situation Overview

Currently, the core processing is done by staff members dealing with their own assessment marks, typically using Excel. The staff member then forwards his marks sheets, usually in paper form, to the administration office where the marks are collated using Excel to give an overall score for each student. These two marks sheets: individual unit marks and overall student marks are then presented to the Board of Examiners for scrutiny and acceptance. The process ends when a transcript is sent to each student detailing their results for that semester.

Presenting Problem Definition

The actors feel that the root problem is about consistency and accuracy given the sensitivity of the data but coupled with difficulties with storage, retrieval and reporting. (See Workbook 6 section 6.2 and 6.5)

Real-World Target – the desired effects here are that consistency and accuracy are both improved but at a reduced workload. (See Workbook 6 section 6.3)

Application Proposal

Based on the presenting problem there an application is needed that can offer us consistency and accuracy in the processing of assessment marks, both by unit and by overall student performance. The system to be called a mark processing system and it will have the following main functionalities.

Functional Requirements

1. Store name, address, year of study, name of course and unit details of all registered students.
2. Store the assessment patterns for each unit including weights and pass mark.
3. Allow for the entry, updating and deletion of any or all records.
4. Allow for the entry of assessment marks for individual entry or by batch updating via CSV
5. Report on marks for each unit including basic statistics.
6. Report of overall student performance, including basic statistics.
7. Produce student transcripts.
8. Provision for other ad hoc reports at a later date.
9. Secure access to individual results to be available to students through a portal.

Non-Functional and Performance Requirements

1. Store records for at least 6 years.
2. Allow for at least 6 simultaneous users
3. System must be capable of processing all the data and providing the reports within 10 working days. The estimated current volume is 145,000 data entries and 139 reports but this is expected to grow by about 7% per academic session.

Technical Requirements

1. Be developed in MS Access 2003.
2. For use under Windows XP.
3. All processing activities, including reporting, to be carried out using native Access facilities.
4. All processing is to be done using Access VB and no macros are to be used.

Usability

1. Be developed using normal windows formats and standard colours.
2. Fonts use in screen to be no smaller than 9 point and standardised at Ariel Narrow.
3. Assumed screen size to be 19".
4. Report to be printed as appropriate but with fonts never less than 10 point.
5. Data entry load per screen to be as recommended in DEF 981.90.
6. There should be some consideration of access via the portal for the visually impaired.

Ethical Overview

The collection of requirement here does not present any ethical problems. However, when in use the system contains personal and sensitive data and this aspect must be considered in the design

System Architecture

The intended application is essentially a database system with a web link. It will therefore have two interfaces: one a direct link to the database through the Access application and the other through a secure web interface routed through a portal but with only read access.

Strategic IT Value

The proposed application and its functionalities should address the presenting problem very well. In particular controlled data entry, data storage and reporting. This should reduce administration overheads and costs in a cost-effective manner.

Aim

To build an assessment marks processing system using standard MS products in order to ensure consistency and accuracy in the processing of student results. (See Workbook 6 section 6.11 and 6.11.1, Workbook 9 section 9.6.3)

Objectives (See Workbook 6 section 6.10 and 6.10.2 and Workbook 9 section 9.6.3)

1. To produce a detailed, departmentally based, marks processing requirements document.
2. To produce a detailed marks database design using standard documentation protocols.
3. To produce a detailed assessment functional design to include data entry, updating, deletion for marks processing and reporting.
4. To design the secure portal for student use.
5. To produce and evaluation report of the marks application.

Research Design Phase 1 – Requirements Collection Process

This part of the research design is concerned with constructing a reliable primary data collection for later processing into the form of answer expected. In this case the primary data collection is a set of detailed requirements for the marks processing application. The primary data that we need is related to the proposed major functionalities stated earlier and given to us in the form of a proposal. For each of the functionalities it is now necessary to decide. (See Workbook 7 section 7.10)

Location – The requirements can be found at various locations in Portsmouth. In particular

Detailed Functional Requirements: the appropriate targets for this exercise are: SIS office administrators, departmental course leaders, individual academic staff, Heads of Department and the University registry (for regulatory aspects). It may also be useful to make contact with a number of external examiners to ensure that the reporting arrangements are acceptable. In addition there will be various documents such as regulations and marks sheets

Non-Functional and Performance Requirements: the appropriate targets here are the Registry since they set examination and graduation dates as well as define the necessary reports. The office senior administrator also needs to be consulted for staffing and usage issue. During this process there must be detailed discussion with the department and the Registry over security issues as this is a major ethical issue. In addition there will be various documents such as regulations, external examiner reports.

Technical Requirements: the appropriate target here is the departmental technical to establish hardware and software profiles. It may also be necessary to discuss network and security issues with the University central computing department. It may be necessary to see network and PC specifications and various security profiles.

Usability Requirements: the basic design is based in Windows protocols so there are no particular requirements to be gathered. However, because it is possible to implement interfaces in a few ways particular usability requirements will be ascertained by use of a mock-up used with the administration staff. With regard to the Portal there will need to be discussion with the University webmaster over formats and protocols to be used. In addition there will be various documents defining standards and formats.

Collection Protocols – The collection is essential a survey format where each requirement aspect will be discovered by just three formats: (See Workbook 6 section 6.6.1)

Detailed Functional Requirements: expressed as interviews, document analysis (marks sheets and regulations) and some observations. It may also be necessary to use observation to examine any existing Portals.

Non-Functional and Performance Requirements: interviews, document analysis (marks sheets and regulations) and observations.

Technical Requirements: interviews and document analysis (system specifications and profiles)

Usability Requirements: interviews and document analysis (system specifications and profiles). In addition it will be necessary to run some focus groups to look at various interface design option by means of mock-ups.

Requirements Presentation – the requirements data once collected will be presented as interview transcripts, notes and copies of documents. These artefacts will be reviewed and a tabular format used to present the requirements and lodged in the project document appendix.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulates it to get a design for the application. This is in two sections.

Overview – here the vehicle used to present the various requirements in a design format will be UML. The mechanism will be to take the written requirements documents and map them to a suitable diagrams in the form of use cases, class diagrams and where appropriate collaboration or sequence diagrams.

Specific - where necessary a written list will be provided. These will mainly be used to state unambiguously the various non function, technical and usability details.

Logistics and Tools – Required Resources

All the hardware and software are available at the Client's premises and all work including requirement gathering will take place there. The major products needed are: Dream weaver and MS Access and scripting will be done using ASP.

Outline Content List for your Project

See project guidance notes for samples and they can be found in Workbook 9 section 9.3.5 and table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See Workbook 8)

Walker (2001), IT Problem Management, Prentice Hall, 0-13-030770-5

Bruton (1997), How To Manage The IT Helpdesk, Butterworth Heinemann, 0-7506-3811-7

etc

Project Plan

Any clear format may be use but a typical format (but not events) can be found at the end of the Study Project sample specification.

3.5.2 Example Complete Study Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Study) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2653)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – no customer involved and project results will be used to produce a research paper.

Project Title - Quality Control in Program Development - A Possible Strategy (Workbook 6 section 6.13).

Project Topic Area Overview

There is much interest in Software Quality assurance at present and this is for obvious reasons. Software applications are unlike normal products which wear out and can be tested over time to see where most wear takes place and hence calculate a mean time between failures. By this means failure can be effectively prevented by maintenance. However, in software such wear does not occur although an analogue of this is when other hardware and software components around the software, or the application itself changes and hence problems arise. Typically, we test program code and the more we test the code the more certain we become that it is robust.

Situation Overview

The research is set in The University of Portsmouth with the School of Information Systems. In that context it will focus on the programs produced by first year computing undergraduate students.

Presenting Problem Definition

The problem for developers is focused on knowing when code is robust and ready for release. (See Workbook 6 section 6.2 and 6.5).

Real-World Target

The benefit that would accrue in the real-world if this problem can be resolved or partially resolved is that developers can feel more confident about their product and therefore not risk costly development overruns and compensation claims from clients. (See Workbook 6 section 6.3)

Research Question

How can developers feel sure that software applications are ready for release in order to prevent costly overruns and client disappointment? (See Workbook 6 section 6.7 and 6.9)

Personal Theory

The topic is fraught with difficulty because there is no accepted way to measure program code to see how good it is or even to see if it is correct. Blithe (2002) explains that it is well understood that it is not normally possible to measure, using an interval and ratio scale, in any meaningful way the quality of program code. However, it might be possible to find some means of 'indicating' the quality of the code in the sense that one might be able to pick outliers by taking certain kinds of measurement. It is therefore suggested, that simple measurements of various code properties might be used to pinpoint outliers and hence shorten the testing cycle by transforming the measurement statistically into a pseudo Interval and Ratio scale form which is called Planar Similarity. (See Workbook 6 section 6.5).

Intended Project Outcome

It is expected that the form of the answer arising out of this theory will be a demonstration in the form of a report with graphical evidence that endorses the proposition that Planar Similarity is an appropriate software quality indicator in that outliers can be detected hence assuring the measurement process. (See Workbook 6 section 6.4 and 6.9)

Strategic IT Value

If Planar Similarity is indeed a useful measure of software quality it can be used routinely to examine software in production and give an early indication of quality and that will lead to shorter test cycles and hopefully more reliable software installations and a consequent reduction in cost. In fact Clitheroe (2003,p6) has suggested that detecting all code faults at the initial coding stage might save as much as 23% of development costs. (See example in Workbook 4)

Ethical Overview

There are no current users of the process being developed there would not seem to be any ethical consideration of importance. However, it is necessary to explain to the students supplying the sample programs the purpose of this study and assure them that none of this information will be used for assessment and allow them access to the results if they so wish.

Aim

To report on the efficacy of the Planar Similarity measure using simple metrics as a means of finding outliers in program code and hence reduce coding errors leading to development cost reduction and client approval. (See Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3)

Objectives (see Workbook 6 section 6.11 and 6.11.2)

1. To model the software construction process.
2. To report on appropriate simple and synthetic metrics that might be used as indicators of quality in application programming code.
3. To define a process that will extract the defined metrics for any piece of code.
4. To document a suitable statistical process for reducing the metric value set to just two dimensions.
5. To analyse and report on the data, including outliers, and hence derive some general conclusions regarding the utility of the Planar Similarity metric.

Research Design - Research Method

The chosen method will be case studies since I want to see the impact of the measurement process within a defined context and of particular interest in that context is student programmers with differing abilities in writing business application style programs. The case criteria are simple and amount to selecting a sample of students at a set point in their first year of study and a set of matched programming tasks. (See Workbook 7)

Research Design - Phase 1: Primary Data Collection Process

This part of the research design is solely concerned with constructing a reliable primary data collection for later processing into the form of answer expected.

Basic Activity for Generating Data

The basic idea is to compare a new piece of code with an existing piece that is known to be sound and take a series of measurement on each one that might highlight any differences and so indicate an outlier. The idea has some support based on early studies carried out by Sheene (1999) who noted that a reasonable means of indicating quality in program code is to compare similar pieces of code by calculating several metrics for each piece although he did not define how this might be done practically. (See Workbook 6 section 6.8, and 6.9)

Primary Data

This study will define 20 software metrics which will be calculated automatically and for each sample programme. The metrics that form the primary data collection for this research will be such things as: function density, function count, cyclomatic complexity, data associations, decision count, decision density, number of variables, number of function calls, etc. (see Workbook 6 section 6.6)

To set up the case studies three computer program specifications will be drafted with the students working in 'C++'. The specifications will be written so that the defined software application is, in each case, of a different style and progressively more difficult. An expert in 'C++' will produce a set of generics to match the requested programmes – it should be noted that a generic is an outline or skeleton of certain kinds or classes of program.

Location – The sample frame is all first year students on computing courses at Portsmouth University. This is around 350 students and my calculated sample size is 200 students, however, since the data collection process is automatic all 350 students will be used in this study.

Collection Protocols – The collection is essentially a survey format where the students will be given the relevant generics and the specifications and asked to write three computer programs of increasing complexity, one in each of three semesters. In this case there is a large data set to be collected and it is not practical to do the collection by hand. In view of this an application will be written that will process each student program so that metrics may be calculated automatically and stored in a suitable electronic file. Students will be requested to deposit their programs on set dates into an online drop box for both marking (not part of this study) and metric calculation. (See Workbook 6 section 6.6.1)

Primary Data Collection Presentation

The sets of primary data will be available in the project document appendix and will be presented in tables where the rows represent the sample programs (one row for each sample) and the 20 columns the metric values.

Research Design - Phase 2: Processing and Presentation

This part of the research plan will take the whole collection of primary data and manipulates it to get the expected outcome form, which was a demonstration that outliers can be detected hence assuring the measurement process. The processing is in three steps: manipulate the raw primary data, presented the processed data in graphical form and extract from the graphs features by manual inspection.

Design of Pre-Processing for Primary Data Collection (Workbook 6 section 6.6.3)

The metric data sets will be read directly from the files produced in phase 1 and then statistically processed to define a similarity measure for each program using principal component analysis and multidimensional scaling. The outcome of this processing will be pairs of values, one pair for each sample program, suitable for plotting in two dimensions.

Design for Results Presentation

The pair of values from the first processing round will be plotted in two dimensions, together with the results for the generics producing three graphs one for each program specification.

Design for Generating the Intended Project Outcome

Once the graphs are available it is then a simple matter to look for outliers in particular and attempt to explain their distance and orientation from the generic and other programs in the class. The contention is that similar programs will cluster together and ones that are different (even though the specification was the same) will show up as outliers and can be identified and examined to see why that difference occurred. It is hoped that the results will be similar for all three program in that data set and hence demonstrate that complexity is independent from planar similarity.

The final step is to use the identified outliers to go back to the actual program code to explain why the code produced the outlier. In this way it will be possible to get an indication of why a given program is deficient. This final processing step allows me to generate my report on Planar Similarity that contains my overall findings and evidence on its utility.

Logistics and Tools – Resources Required

All the hardware and software are available at the University. Since the data collection process is automatic the use of staff resources is minimal.

Outline Content List for your Project

See project guidance notes in Workbook 9 section 9.3.5 table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See workbook 8)

JKM Quality Assurance Handbook (Company Confidential)

Garlick, F. J., (1993), Planar Similarity - A New Synthetic Metric, SQM, Elsevier, 1-85312-225-4

etc

Project Plan - Master Schedule expressed in weeks (You may assume that a project take about 18 weeks to complete)														
Dates are Mondays	March				April				May				etc	
Event	6	13	20	27	3	10	17	24	1	8	15	22	29	etc
Literature Search														
Identify metrics														
Write Metric program														
Etc.														

4. WORKBOOK 4 – LITERATURE REVIEW & STRATEGIC IT VALUE NOTES/EXAMPLES

This is a sample of what is expected in assessment 1a, however, it only shows two elements: the strategic business IT statement and the short Literature Review. Try to keep in mind that this is just ONE example and do not try to copy it blindly or try to fit it into what you want to do.

Strategic IT Value

This work was based on trying to resolve or partly resolve the problem of low quality code leading to the need for costly re-work at later stages in the development cycle. The importance strategically of this work is that the outcome: a definition of new software metric will imply that it is possible to identify poor application code and this can be done at an early stage in the software development life cycle. The importance of this is that corrective action can be taken early in the development cycle and as a consequence costly re-work late in the cycle can be avoided or reduced. A secondary or added value element is that the results will allow the identification of good programming standards and this in itself will also lead to improvement and strategic advantage on all products delivered.

Tutor Comment

The key element here is that one relates the expected outcome or form of answer to its use in resolving the problem theme that was the basis of the project, and hence demonstrate a strategic business IT value. Failure to create a clear argument based on the problem theme and outcome leading to a strategic business IT value will mean loss of marks.

Literature Review (See Workbook 5 but note section 5.6 in particular)

Hiskett in his 1987 seminal paper on metrics defined several apparently useful metrics, the best known of which are 'program vocabulary' and 'program length' which are essentially metrics that count operators and operands and their usage in a given piece of code. Hiskett's metrics are easy to calculate but he was unable to show any strong correlation between his measures and program quality as defined by experts in the field. Similarly, Rogers and Hamerstein tried to use Hiskett's metrics as predictors of MTBF in accounting software but the results were inconclusive and no link could be found between the metrics and the type of software (functionality), accounting in this case, and the metric used.

Garlick, Sheene and Southwood (1999, p450) attempted a new approach that involved the notion of similarity, which they called planar similarity – that is two programs could be defined as similar because: they are written in the same language or they perform similar functions or they were written to the same standards or they are written to the same specification or they were written by the same team or finally they perform the same function. Their work is aptly summed up in the opening paragraph of their paper:

"The nature of any true measurement is easy repeatability and this implies that the style of measurements form a suitable metric space. This means that we need to define the nature of the similarity before we define a measure. In principle this is simple since it is easy to name the similarities but in practice it has been difficult to articulate a precise definition."

The similarities described above deserve further explanation but here only two of them in combination are used: similar language and similar or same specification. Similar language is easy to understand but at first glance it would seem that if two different programs are written to the same specification they are bound to be the same. However, after a little thought, it is obvious that if two different people write two different programs to the same specification the programs are certain to be different in many respects. It follows that the basic, though loose, hypothesis is that if planar similarity can detect a similarity (alternatively difference) in these programs - written to the same specification but by different people - it might be possible to use planar similarity to detect differences between two or more programs against any defined mode of similarity. Conversely, if it cannot be shown that a similarity exists between two or more programs written to the same specification then there is no hope whatever of showing any other kind of similarity with this metric.

Two final points need to be considered: what exactly is meant by software quality and why would a similarity measure be a good indicator of quality? To answer the first question we have only to refer to Kitchenham's 1998 paper where she defined five kinds of quality, briefly:

Transcendent View – quality is a kind of innate excellence, something felt rather than seen.

Product Based View - quality is related to the content/attributes of the product.

User View – quality is seen as equivalent to fitness for purpose.

Manufacturing Based View - quality is equated with conformance to specifications.

Value Based View - provide product at an acceptable price and conformance to a specification.

In this study the transcendent view was the one chosen as the basis of the definition of quality. The meaning of this view is defined by experts in the field – that is, can an expert in, say, Java programming make a judgement as to whether a given piece of code is good or bad – well, here it is argued that such an expert can and does such tasks routinely. Curiously there is very little literature on this idea of expert opinion within the software community but Gavin as early as 1978 touched on the subject. However, it is a reasonable conjecture and it will be used in this study – interestingly, if it can be shown that planar similarity can detect similarity (or equivalently differences) then it would also support the conjecture that experts can judge software quality.

Finally, the study will rely on the ability of experts to judge quality in software. This judgement is exemplified in the production of exemplar or generic programs. Garlick (2003, p98) has written extensively on this subject and the work is well known and will not be fully reviewed here. However, it is possible to define classes of program modules - validation, input, calculation, reporting and so on – it follows, that using the idea of similarity it is useful to create a standard or *generic* program or module for each class. Such a program can then act as a base line for all planar distances related to its application class and hence be a measure of similarity (or difference).

Using Garlick's idea we can let experts define our generic and then use that to compare with other programs – if we declare a difference then in simple terms we need to look at that program because it might be of poor quality and conversely if we declare no difference then we can fairly conclude that the program is sound.

Tutor Comment

The literature review is supposed to be a student's own work. As such it is a discourse that outlines the major areas of a topic area but amounts to an essay which is the student's alone. In practice this means that students must read deeply into the subject and then weave what is read into what the student already knows or believes in order to create a useful summary of the topic that will form a strong base for carrying out the actual primary data research - this implies that you 'master' the subject area and become expert in it.

It follows from the above that if all you do is copy or paraphrase from various sources without any significant comment or analysis on your part then it amounts to plagiarism and is worthless.

One final point is that when you write up your review in your final project document you should use various sub-headings and other formatting elements to structure the section to make it readable and meaningful.

5. WORKBOOK 5. LITERATURE REVIEW

The main function of this review is to ensure that one's mind is prepared with all the specific problem area knowledge that it needs to carry out the project and its primary research. In practice this implies the rather difficult task of integrating different ideas, theories and experiences into a thematic, informative, complete and clear discourse on your chosen subject area.

Preparation of the mind is done through adding your critical evaluative comment on what you find in the available literature and such critical reviews are typically hard work and not about downloading a few articles from the internet. The key characteristic of the greatest thinkers in history was absolute and unswerving honesty in all their thinking and that principle has never changed. They used their intellect and reasoning abilities to the full. They were honest no matter what the subject be it religious, political, business or academic. These men would not accept dogma from religion, politics or academic sources without subjecting it to serious critical questioning and of course this often meant great suffering for them.

5.1 Plagiarism

The KEY is honesty – without that your work is worthless – you may be able to fool some people but as Shakespeare said “This above all: to thine own self be true, and it must follow, as the night the day, Thou canst not then be false to any man. So when you plagiarize I may not know, the University may not know but YOU will always know that you obtained something falsely.

Plagiarism means passing off other people's ideas as your own. In academic life, it is one of the worst things that anyone can be accused of, as it is a form of stealing or cheating. It is fully expected that students will carry out research prior to completing a piece of work. This may include the use of books, journal articles, reports, manuals, notes and so on as source material. The material may be public, restricted to a closed set of people or with a security classification), or privately communicated. The principles are the same whether the material is on paper or in an electronic format. When you refer to an idea in a piece of your own work, it falls into one of several categories:

Common knowledge - many people know it and the information does not belong to anyone person but it cannot normally be deduced by you it has to be learned. It is probably talked about in several sources: the world is round, computers contain both processors and memory, OO is routinely used in software construction and so on. If you are sure that it is common knowledge, you do not need to cite a source. Be careful, authors will often write down in their own work things that are common knowledge so quoting them in that instance amounts to saying that a bit of what is common knowledge actually belongs to that author and that of course is an absurdity.

Obvious – many people know it and the information does not belong to anyone person but it can be deduced. It is probably talked about in several sources: companies tend to grow as time goes on, when the sun goes down it gets dark and so on. If you are sure that it is obvious you do not need to cite a source. Be careful, authors will often write down the obvious in their own work so quoting them in that instance amounts to saying that what is obvious to every one actually belongs to that author and that of course is an absurdity.

Published – this refers to an idea that found in a specific source or sources which is not common knowledge nor obvious but is nevertheless useful – in these cases you must always cite the source or sources of such an idea.

Original – you may include freely original ideas of your own. However, be aware that if the reader sees an idea that is not cited and is not common knowledge nor obvious, then they are entitled to believe that either it is a new idea published by you or you have plagiarised it.

5.1.1 Identifying Plagiarism

Plagiarism does not occur only when you copy words verbatim. Plagiarism is about ideas, and even if you express the idea in your own words, you may still be guilty of it if you do not credit the source. However, expressing an idea in your own words might often be good scholarship. The difficulty is that anyone can copy and paste a phrase, sentence or paragraph and cite its source. This is technically not plagiarism, but it's often very poor scholarship since it is obvious that such an activity tells us nothing about the learning, if any that has occurred

Scholarship is about showing your understanding and criticism of ideas. Simply copying, paraphrasing or summarising can only show understanding only to a limited extent. You need to "add value", that is make your own contribution to knowledge, to what you've read and you can usually only do this by expressing an published ideas in your own words and mingling them with your own thoughts and ideas.

5.1.2 Common Critical Devices

The essence then is to infuse your work with your own thoughts and ideas and let these mingle with what it is you have found in the literature. The most common forms of this are:

Interpretation - explaining and expanding on what you have found.

Criticism – discussing in order to judge whether the ideas are good or bad.

Decomposition or Analysis – to tease out the constituent parts of an idea.

Synthesis – by means of discussion and explanation link separate ideas together.

Selectivity - showing which ideas to include and which to discard.

Abstraction - taking an overview or defining a model or framework, usually by looking at examples.

5.1.3 Common Literature Tools

The following are the most common means of incorporating, in a scholarly fashion, the work of others into your own written work (a fuller discussion of these tools may be found in the notes).

Copy – use the exact words using quotation marks. A good rule is that each quote holds a single main idea, which you want to use and then you must introduce it and then follow it up with discussion.

Paraphrase – expressing something that you have found in the literature in your own words - the intention being to simplify, explain, or interpret a complicated idea. But take care there is a very fine line between simplifying, explaining and translating something and just being lazy.

Summarise – producing a précis or abridgment of a part of the source we have found. Essentially one is trying to capture the main points in an argument.

Analyse – the purpose here is to offer a detailed examination of some whole by scrutiny of its parts.

Synthesise – here the idea is to take parts and put them together into a new whole for some purpose.

You might find it useful to remember: copy in order to discuss, paraphrase to simplify, explain or interpret, summarise to capture the main points, analyse to understand and synthesise to build something new.

5.1.4 University Review Assessment

When the University looks at your Literature Review it will be trying to decide if you are committed and prepared for the topic and working at Master's level. If your work is poor in terms of structure, content and form you will find yourself failing. This is NOT necessary so long as you put in the work and ensure you understand how to use citations and the literature. I want to encourage you to do good work - it will ensure that you pass well and it makes your work a pleasure for the Examiners to read.

5.2 Review Content

The review is about your topic area and about you becoming sufficiently expert in it to deal with the problem that you will have uncovered. The intention is for you to offer a discourse that is focused, relevant, authored, measured, evaluative and expressed as a dialogue. (Notice the acronym FRAMED)

Focused – this means that your whole effort is focused on the topic area and the particular aspect of it that you are pursuing. So do not be tempted to add in other things just because they might be useful, interesting, and novel or you just have nothing else to say.

Relevant – any topic area aspect will itself normally represent a large body of knowledge and so one needs to continually ask if a particular element in the knowledge domain is relevant to your particular study.

Authored - any literature review is to be written by its author. This sounds obvious but it is all too easy to fill up a review with cited quotations, paraphrases, summaries and so on so that the 'hand' of the review author is not evident anywhere in the work. When this happens it is not an evaluative review at all but simple plagiarism. The author's 'hand' must guide and direct the review in an evaluative fashion so that the review is a message from the review author and not a recitation of what has been found elsewhere.

Typically this is done by using ones own skills and knowledge to introduce, comment, add to, modify and extrapolate from various primary sources available.

Measured – this is a matter of selecting and using the focused and relevant materials that you have found. Unfortunately, It is all too easy to pack in information in excruciatingly precise detail and so end up with a laboured entry that treats your readers as if they where completely ignorant of the subject area. So here one needs to just say honestly “is the entry a measured response to my and my readers, information needs”.

Evaluatory – authors sifts through the primary sources looking for materials to use. The essence of this sifting is an evaluatory outlook based on an awareness of your problem theme and your topic area. Care is needed because this process is not about searching for materials that you agree with or like in some way. Instead it is a contextualised response (what do you already know) and that may mean you find materials that are new to you, materials that make you change your own knowledge base and often materials that completely replaces what you thought was solid.

Dialogue – a review is a form of argument because good ones are based on a strong theme and in them one is trying to explain to, and convince your readers about something and so it is best if you think of it as a kind of dialogue in which you vicariously challenge them about your review theme and content.

5.3 What goes into a Literature Review

It will depend to a large extent what it is you are working on and what you want to say but the following list give some common ideas of content.

Challenge – this is two way: what you read challenges you and you challenge what you read for validity and applicability and so one might find new ideas or change our perspective.

Consolidation – reading widely consolidates your own knowledge base in that is can confirm or show any gaps in your knowledge.

Exploration - implies searching for new ideas, theories, concepts, rules and so on.

Self Check - affirm what we know for currency and accuracy

Support - the reading might support or be in opposition of ones views

5.4 Integrity and Evidence

This heading sums up research - integrity because it must be your own work and evidence because you MUST be able to show that your results have value. There are basically 4 strands to good work as follows

Dogma – this simply means things you have to take at face value. Most often they are things that are not open to reason in the sense that one is not allowed to question them and in some countries you can find yourself in serious trouble if you do. The problem with dogma is that by definition there is no logical support for it. Just to use a simple example, some faiths require you to have a beard or not eat pork as a matter of dogma – in such cases we usually cannot logically deduce that this is a right or wrong thing. It may of course be simpler than that since we all invent our own dogmas from time to time – for example it may be very simple such as ‘I will never buy a Ford car’.

We all accept dogma but that really is not the issue – the issue is that we should not accept it without some critical thought. There is at least one rational way of exercising critical thought on dogmatic issues and that is asking is the outcome of actions based on it good, bad, neutral or at least does not harm anyone. The trouble however, is that dogma sticks to us like super-glue and we will often go to great lengths to defend it and almost always this is done by sophistry (worthless arguments) and of course the notion of what is good or bad is not easy to define.

Reason – this is the ability to be logical and reason about what it is you are reading or writing. That is you are encouraged to ask questions and seek for a deeper understanding. This may imply that you accept new information, modify what you already know or reject something as no longer valuable.

Honesty – here we are talking about not taking things at face value and being honest with yourself about what you are reading or writing and asking does it all make sense and is it coherent with what I already know.

Motive – this aspect is about your reasons for wanting to read or write something. Now such motives can be high minded or they may be base. One must therefore always guard against tendentiousness (the author simply wants to convince a reader of something and may use any means to do it) in ones own writing and be watchful for it in the writing of other.

5.5 Literature Sources

The available literature is classified broadly speaking into the two kinds described below and ideally we only want to use primary sources.

Primary Sources – that is the first published documents. One can be really pedantic and say the real primary sources are the author's manuscript or autograph but these days we are satisfied with published sources. It will however, often be difficult to establish that something is indeed a primary source.

Secondary Sources – in almost every document you see, there will be elements attributed to other authors – these are then secondary sources.

Be careful not to confuse the above definition with those for primary and secondary data. When we talk of primary sources we are obviously referring to something that is published and exists whereas with primary data it will not exist until a researchers defined, locates and collects it.

5.6 Basic Writing Rules

For Study projects a full literature review will be needed but for Engineering projects the requirements document forms part of the Literature Review. However, even in Engineering it is necessary to write a short review just to form a technical backdrop to your project. It may help you to remember there are two cardinal rules when writing – they are simple:

Respect – always have a deep respect for ones readers and make it easy for them to understand what you are saying.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying. The key task is to formulate ones own ideas, in your own words but one does this by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

5.7 Literature Assessment

When assessing this element the University will look at how YOU use the sources in what you write and at the range of sources that you used. If either is judged deficient your work may not be accepted as the view taken will be that you are not prepared for work at this level and on this topic. It is expected that all your sources will be mostly primary ones. If there is some reason why this is not possible it must be discussed with the Research Methods tutor or your project supervisor.

5.7.1 Literature Review Structure

All the following steps are iterative and you must expect to go backwards and forwards many times before you get a review with which you are happy.

List – Make a list of all the various topic strands that you need to know about. It may help you to think about strands such as: organisational, administrative, functional, social, technological, cultural, ethical and so on or some other structure best suited to you topic. Remember, this is not about writing down everything you know it's about giving your readers a focused discourse on your chosen topic area

Arrange – Use your prepared list above and put the topics into a logical and progressive order.

Theme – Decide on a theme that will link all the various topic strands together.

Structure and Content – Now use your themed list of topics and structure what you write using headings, subheading, paragraphs, bullets, tables, diagrams and so on.

Reading/Writing with the Intellect - This is normally thought of as a four stage process that applies equally to what is written (because it is going to be read by someone).

Understanding – this is simply taken to mean that we understand the words used.

Interpretation – are able to find meaning in the words used.

Evaluation – we ask does the meaning have any value – in essence we ask is it true or false.

Contextualization – this implies that everything we read is coloured by what we already know. This idea is taken much further in the idea of hermeneutics (see the notes).

Usage – the literature that you find and evaluate can be used to supplement your own work and demonstrate your mastery of the topic area. This does not mean that you quote, paraphrase or summarise everything you see. As a rule of thumb: only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation.

Argument - Finally, keep in mind that when writing you are dealing with a form or argument where you are trying to persuade your reader about some point or other and that should only be attempted when you are knowledgeable, the argument is essential and you have a deep respect for your readers.

5.7.2 Literature Review Construction

Here is a plan that you can use to construct your own review. It is not infallible and will require conscious effort from you and it must be based on a thorough evaluation of the literature.

Step 1. Purpose - the purpose is to fully prepare your mind with all that you need to know about the topic area and the particular element of it that you are focusing on. The idea is that what you write shows your mastery of the topic and in fact you have become an authority on the topic area. So a review is not a long list of quotes, paraphrases and summaries, it is an evaluatory discourse. That is, readers will want to know what YOU have to say based around what you have uncovered in the literature - so readers must see what you have found and see what you have to say about it.

Step 2. Topic and Aspect - Make sure you are clear about your topic area and which particular aspect of it you need to explore and understand in order to be able to effectively carry out your planned research.

Step 3. Select a Theme - Use your project problem definition, target and outcome to guide you in selecting a theme that will connect all the various elements of your review together making it a lucid and progressive discourse. (Don't be afraid to alter the theme as you go along if that becomes necessary)

Step 4. Your own Views - Try to make a list of your own views, ideas and knowledge. Remember, the review is an evaluation of what you find not a recitation of it. If all you do is tell us what you have found you may not even pass because almost anyone can write a review on any subject if all that is required is to more or less recite what has been found. So you must structure the review around your theme and your own ideas and thoughts.

Step 5. Make a Review Content list - Based around your theme make an outline list of things to include and then arrange the list into an order that will take you progressively through the topic area aspects. Commonly it is found that it is useful to start as follows.

5a. Basic definitions and terms that need to be clear for the core topic area. (Be careful to note any abbreviations)

5b. Map out several important areas or problem space dimensions. Now it is impossible to be general here so for example if I were looking at mobile devices and their use in business I might map out the following elements: value, attitude, use, limitations, practice cost, ease of use, learning curve, effectiveness and so on. Please be careful here to look for significant things not just drag in anything and everything. Once you have made this list you may add to it, modify it or discard from it as you go along.

5c. Work out how you want to end the review - often this just sums up your point of view but you may have other ideas

5d. You may like to include some statistics if that is relevant. But don't let this run away with you and so the review just becomes some sort of justification based on statistics. Remember, statistics almost never tell us anything about the topic itself and only tell us things related to the relative importance of certain things we have identified.

Step 6. Literature Searching - Armed with your theme and list of elements now start your search for suitable material but be very careful to record the exact details of where everything may be found and checked. The search may start with the Internet or a special tool like Google Scholar but must move on to respected publications.

Step 7. Structure - The step is to structure what you have found and what you want to say about it so we get a coherent and lucid discourse on your chosen subject area. This is not a trivial matter and you must expect to go over it many, many times before it is really an example of your very best work.

5.7.3 Literature Review Traps and Pitfalls

Most of the things listed below are regarded as due to simple laziness and so are unforgivable in a Master's student or indeed any research student and if you are guilty of them then expect severe punishment in terms of loss of marks or failure overall.

Not a justification - A literature review is NOT a justification for your research idea or problem definition. So filling the review up with various statistics will never be regarded as explaining to the reader the topic area and your evaluation of it.

Statistics - Filing up the review with statistics carries no real value in convincing the markers that you are master of that topic area.

Poor Structure - where the review is little more than a few drafts notes obviously written without much thought. To communicate you must impose some structure on what you write else the readers will not be able to see any progression in your thought or in the topic.

Filling up the review with citations - one after the other with no student input. It is correct and desirable to tell your readers what you have uncovered but unless you make comments and add your own views on what is found the work will be regarded as worthless.

Common knowledge and Obvious - Quoting or paraphrasing material that is either obvious or common knowledge implies that you have not looked at the sources beyond the first page or forward. Here is an example from a project document. "Poston (2000) stated that organisation expected ERP systems to deliver improved performance". This is worthless as it is obvious that they would want this and to say it make no valuable point at all - its no good trying to say things like this as if Poston was enunciating some law of the Universe or a point of huge importance on some new and valuable angle related to ERP - no he is just stating the obvious.

Bad citations style - It is very common unfortunately to see the citation form (Briggs, 2000) placed at the end of a sentence or paragraph. When we see this it can ONLY mean that all you have done is paraphrased, summarised or copied that section. This practice is more or less plagiarism and is representative of a very lazy attitude that assumes that just expressing something in your own words is a valuable contribution - its is not because YOU are saying nothing and what you are supplying is not really your own work at all.

Activity Definition - Some students use the Literature Review to tell us what they are going to do in the research. This will result in a zero mark as what is to be done is covered in the Research Design so repeating it here is valueless. This practice is a certain sign of laziness.

5.7.4 Reference and Bibliography

References are to primary sources that you use in the text of your written work. A bibliography is a list of sources you have identified as useful, including references, but not necessarily used. The University will look very carefully at any references to see if you are prepared for study at Master's level in your chosen topic area. Overall, the expectation is that you will list at least 10 sources. For each source you must consider its:

Currency – looks at publication date and be aware of changes in technology.

Completeness – Make sure you are looking at the final version not some draft or abstract.

Uniqueness – is the source a primary one

Coverage – Use your list of sub-topics to ensure that you cover all the areas required so that you are fully prepared. But make sure that you are not including multiple texts with essentially the same content.

Range – Make sure you have a good range of authors.

Authority – ask is the text authoritative. This can be done by considering the author, publisher, writing style and currency. It is also possible to use citation indexes to see how often the source has been used.

Accuracy – Is the information correct? If you cannot be sure then you must not use it.

Relevance – Make sure that your sources are relevant to your project topic.

Usage - The basic usage strategy is:

Find – Relevant texts using a library index, the internet, online book stores and so on.

Evaluate – Once you find a possible source you must evaluate it for content and relevance.

Contextualise – that is fit this new source into your personal knowledge base.

Cite – If you use a source it must be listed in your reference section and cited in the text correctly.

Discuss – You may include something from a source in your work as a copy (quote), paraphrase or summary but in all cases you must introduce it, comment on it at cite its source.

5.7.5 Evaluating Internet Resources

When using internet resources it pays to be careful and always sceptical because of the following factors:

Anarchy - anyone can publish just about anything on the Internet

Validation - authors do not always have their materials checked by an authoritative third party

Tendentious – when the author wants to convince you of something use any means to do it.

Honesty - authors may not always be what they seem and may assume personas, lie or make false claims

Consider – the motives of those who publishing on the Internet

Trust - in research trust nothing until you have good cause to do so. This is the opposite of what we do in our daily lives in that we tend to trust until we have reason not to

Context – be aware of the context of what you find. For example is it a University site, is it a manufacturer and so on.

Accuracy – this simply mean is the information correct. You need to be aware that information might be validly collected but still be quite inaccurate.

Validity – this simply means that we ask is this a valid source in the sense that it was constructed in a reliable manner. Any lack of information on proof readers, editors and publishers means that mistakes are more prevalent than in print and therefore increased scope for innocent error and for outright deception.

Authority – this means was the author competent to create this material. For example any one could have an interest in say Emotional Intelligence and quite easily create an internet article on that subject but it would not have the same authority as that of a University professor who has spent years researching the topic.

Uniqueness – here we are asking is this an original work (a primary source)

Completeness – this may simply be described as asking if the work is the final and finished version. You need to be very careful here else you might find your self using the material from the earlier part of the work which in fact is augmented later in the work.

Coverage – this means what is the scope and scale of the source. Now this does not mean that a source will cover everything on a given topic but it should be clear as to what it is covering.

5.8 Citation Examples

The following set of examples is intended to show some poor use of citations and also some sound ones. These examples should be studied with care by students so that they may avoid inadvertently fall into the trap of using poor scholarly practices. The quotes are from a range of sources and topics and in your study of them you need to concentrate on the form. Now assume all the following were all written by the Research Methods tutor so the comments will be offered in the first person and he is talking to you

These are just simple examples and they do not imply you must use italic or indenting as that is only used here to show clearly the pieces of work being looked at.

Example 1.

Lyau & Pucel (1995) found a link between training and productivity for their sample of Taiwanese car part manufacturers. Bartel (1994) found that training is a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors. Bishop (1994) and Barron, Black & Lowenstein (1989) both found that training increases management estimates of productivity.

This is poor because I only told you what the cited authors said. I did not introduce the author's words, nor discuss them and it's almost impossible for you to see what point I am making other than the obvious one that productivity and training may be linked – in effect it is not my work at all and there certainly is no sense of evaluation here.

Example 2

It has been found that because Arabic words were written by copyists who did not use vowels that over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that it looks as if I attributed the entire paragraph to Noldeke. So you can have no idea which part of the paragraph was my own thought or maybe none of it was. This is bad practice and some tutors even regard it as blatant plagiarism. The fact is that tutors when they see this form in will automatically assume that all the student has done is paraphrase what he has found and none of it in effect is representative of any student thought and will mark the work down because of it

You can use the bracketed form if you just want what amounts to passing reference to a source as in the following example.

In two recent works (Harding 1986a, p.80; 1986b, p.138) it has been suggested that ...

Example 3

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that "change in organisations is an inevitable consequence of growth" – this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdal is clearly obvious and that by Briggs is common knowledge. Also it is not entirely clear that the second sentence leads logically from the first one. The point is that using citations here was unnecessary and therefore worthless.

Example 4 - Suppose you come across the following in a book by Noldeke. But the bit that interests you is by Frederickson – how will you set about properly using and referencing the Fredricksons quote?

Tools are needed if we are to measure software quality in a meaningful way. The idea of quality, as we know, is intangible since many views are possible. It follows that we must define some terms in order to measure quality. It is useful to note what Fredrickson said: "Definitions of what quantities we need to measure in order to assess software quality are at present arbitrary since as far as we know they have no connection with functionality".

This does not mean that they lack a rationale, but simply that professionals disagree on the definitions themselves and so it follows that

In this case the correct way is to find the Frederickson book and use that because it is the primary source. Quoting from secondary sources will only be tolerated in proven cases where the primary source cannot be found or for other reasons is inaccessible and it must be done in the correct manner as shown in Workbook 8 for secondary sources.

Example 5 – Can you work out what the following extract from a piece of student work is saying – if you can please tell us in simple words

It is argued that tacitness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

The sentences is obviously copied as it is very, very unlikely that any student would write with such academic complexity and obscurity – lines like this are not designed to communicate they are designed to impress the reader not further his understanding. What it in fact it is saying is that some skills are very difficult to duplicate and this may mean that growth may be restricted.

Example 6 – Here is a good example and in this case I paraphrase the idea rather than use quotes. Notice how I: introduce the idea, state the idea and discuss the idea and so I weave into quotations, paraphrases, summaries or whatever my own words and thoughts and evaluations.

There has been a long standing problems with some early Arabic manuscripts in that many words have become obscure and even in context they are still unclear. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowel, over time the meaning of some words became lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use "assonance analysis" to study word endings and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes.

5.9 Literature Reviewing Cautions

Writing a literature review is a difficult and time consuming task if it is to be done well and there are no short cuts to sound scholarly work so here are some final pointers.

Laziness - It is very common to see students write down things in a literature review as they occur to them. This practice might be fine for notes but it is obvious that the way thoughts pop into ones mind or information is discovered is most often anything but logical or structured.

Structure – to communicate in writing the work must have an effective structure that is well planned and allows the theme to develop to it natural conclusion.

Pretence - some students try to be scholarly and pack their work with quotations and paraphrases – this then become not an evaluative review of what was found but a recitation of it instead.

Non Review - some students just write down what they know without any references to the literature – this will always lose you marks as no one will believe that you obtained that information by your own brainpower without any outside assistance.

Experience – students often claim that what they write is all down to experiences but again no one will accept that. They way you use experience is in your evaluation of the sources, comments on them and building up your own arguments.

Inclusion – Preparation of the mind for your topic area does not mean you write down everything you know that might be relevant. What it does mean is being focused on your topic area and becoming expert in that. For example, an Engineering project where the literature review contains page after page devoted to telling the reader about every conceivable life cycle is hopeless and in such cases there is almost no thought over what is written and so it is worthless. Similarly, if a study project was looking at eCommerce as a way of selling drugs then page after page telling us about various drugs, treatments and prescribing practices is worthless in the context of just selling drugs. It's not volume is wanted but considered content.

6. WORKBOOK 6 – MAJOR PROJECT ELEMENTS

This workbook is intended to help students formulate clear project elements but here that what is said here is a mechanical process and it is your responsibility to make sure that what is written down makes sense.

6.1 Scope and Scale

Scope and scale are meant to be considered carefully otherwise a project which is out of control and way beyond your capabilities in the time available may occur. Alternatively, the scope and scale may be set so that the problem becomes trivial and the idea is rejected. So please take note of what these terms mean as far as this course is concerned.

Scope – this means something like selection or choice. So for example, if I were looking at training in desk-top packages I might select just Excel or I might select Excel and Access and so on to focus on. The point is I set my scope by being selective.

Scale – the means something like number or extent. So for example if I set my scope as looking at Excel I now need to set the number of users I will include in my study.

Scope and scale are two dimensions that set a frame around your work to bring it into sharp focus and exclude everything else. You need to put limits on both these dimensions but it is most important is to be clear about scope – that is, what exactly to include in your study, normally, just include ONE significant thing.

6.2 Presenting Problem

In any project it is usual to choose an area of knowledge and practice to be its topical focus. For example, one might choose modern usability issues, automated network management, digital paper and so on. Once one has a topic area like this it is necessary to choose a problem theme within it to be a sharp focus for a primary data research effort. It is best if one problem theme is chosen and its resolution or partial resolution would be of strategic business IT significance. In general, it is not all that easy to give a simple and all embracing definition of the notion of problem but the following has proved to be useful.

A problem or issue is something that is a matter of concern or debate within the topic area and whose resolution might bring benefits. (Checkland 2003)

In practice this means a problem is an object not an activity. For example, stating the problem as “how to ride a bicycle” is incorrect since this is not the problem it’s a question about the problem - the problem is “riding a bicycle”.

Another difficulty is that students often write down the problem in such a way that it is an answer or solution to the problem. So for example, if one writes a problem statement as “lack of training” then implicitly that is a solution as well. When this happens it is almost certain that the writer is not thinking about the problem at all but is obsessed with a particular solution. In this particular case the real problem might have been “errors in data entry” and one of many possible solutions is training.

6.2.1 Defining the Problem

It is always quite a good idea to construct one's own definition of the problem and to do it in as few words as possible. Notice, that it is your own definition not one you might look up in a book or on the internet (though you might start with that) because there is often little learning value in just copying a definition as far as deepening your own understanding is concerned.

Remember, that any definition one constructs will not be absolute and universally accepted by everyone - but in research this is not a problem as long as the researcher makes it clear what particular definition is being taken. Do not take this process too far and end up with either over-complicated or trivial definitions - they must be thoughtful and comprehensive. So it is recommended you start by thinking about four things where the acronym CAPE is used:

Characteristics – observable features or facets of the problem idea,

Associations – every problem will have links to other situation elements,

Perspective – when a problem is encountered it will always be from a certain perspective

Effects – say what effects ensue in the real world if the problem is not resolved.

6.2.2 Defining the Problem - Example

Let us suppose that a student has identified the problem theme as Phishing. Naturally, the student will be concerned that this is a good idea and would like confirmation of that before expending time on it. One can

ask the course tutor, but he/she is not expert in everything so at best one would only get an opinion as a response so how should a researcher proceed. So for Phishing a researcher might note the following:

Characteristics: illegal, intrusive, upsetting, preys on those who trust their fellow man, etc

Associations: email, chat, file sharing, etc.

Perspective: management (but try to look at it from several perspectives as well)

Effects: destroys confidences in the system, may lead to personal or company losses etc

Normally, it takes quite a few attempts before a definition that is lucid and comprehensive is obtained. Remember, the definition must also be useful within your research study – that is, it's no good having a well formed definition that does not offer a sound basis for a research effort.

Now here is a first attempt

In the modern world email is a technology that almost everyone uses whether in the home, at work, on the move and indeed it seems to follow one around. Typically, email is a simple one-to-one message passing technology but it is now offered with enhancements that include voice, video, chat, file passing, file sharing where suppliers are attempting to present a complete communication environments. With such a technology come problems and one such problem is identity theft and one way of getting this is known as Phishing. In its simple form an unknown, but apparently authentic, source asks for personal details and then uses them for fraudulent purposes. The problem is identity theft using email systems where a message poses as a legitimate requestor in order to fool the recipient into thinking it is legitimate request. The problem in computer system is known as Phishing.

Here is a final attempt (but most often there are several intermediate attempts)

Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as legitimate request. The intention therefore is to fool the recipient of the message into releasing information which can subsequently be used for fraudulent purposes.

6.2.3 Cautions on Problem Definition

The acronym CAPE is just an aid to formulating a definition so one should not worry whether something is a characteristic or an effect - that does not matter very much because the whole idea is to uncover problem aspects and expand one's understanding of the problem theme.

As a very rough guide one often finds that the final definition must come down to about a third of what we start with. In most cases if one is familiar with the subject it is possible to create a good definition in about 1 to 2 hours and then if necessary update it as your project progresses as it is almost certain that there are elements that have been missed or imperfectly understood.

6.2.4 Problem Size

It is hard to measure the "size" of a problem because there is no scale on which to gauge it. But one can look at two aspects to get some idea.

Current Effects – think about the effects of the existing problem and try to assess their seriousness in terms of the context in which it is set. In simple terms just ask "is it worth solving".

Form of Answer – perhaps a better guide is to think about the form of answer and see how extensive, important and how hard it is to get. For example: one student wanted to deal with password overload – a clear problem with which we are all familiar but his outcome was a set of guidelines on how to construct good passwords but in my view that was a trivial answer to the problem because those guidelines can be found almost anywhere and it is doubtful if that goes anyway to solving the overload problem.

6.3 Project Target

When you think of a problem you normally do it in relation to its effects. It follows that you have to think very early in a project about what effects will be generated if you can resolve the problem – these real world effects are called the project target. Normally one settles on one major target although it is permissible to list more than one. Targets are effects so these are typically introduced by a verb form (increase, reduce, remove, reduce etc) and tend to be such things as: improved accuracy in data entry, to gain infrastructure resilience, streamlined workflow and so on.

6.4 Project Outcome

It is obvious that at the start of a project we do not have its outcome – but we can have some idea what its form may be. Therefore if we know our target we can speculate about what could be generated as a project outcome that might generate or go some way to generating the desirable target. It follows that whatever we

decide is the form of outcome we are looking for in the MSc project it must credibly be able to generate the stated target. Outcomes are objects and so are typically expressed as nouns: Here are some examples:

The target of “improved accuracy in data entry” might be generated by a project outcome of a training needs assessment report or a training plan.

The target is “to gain infrastructure resilience” might be generated by a project outcome of a revised backbone design or a set of recommendations for new technology.

6.5 Problem, Theory (Speculation) and Form

It is often useful when thinking about the solution to a problem theme to think of it as based around or generated by some personal theory a person holds about that problem and its setting. Essentially, one gets at this theory by speculating about causes and possible solutions routes. It is not easy to say how to speculate but it can be said that it is aided by a thorough literature review, personal experience and a deep consideration of the problem theme perceived in a given situation.

For example suppose the situation was related to issues with application software implementations in business not being as successful as expected. Recognition of this problem theme is a first step but if one is to do something about it, it might be useful to thoughtfully speculate on why success is lacking in this area. It follows that one might speculate that this lack of implementation success is due to poor implementation strategies, or poor user training, or poor project management or any number of things. Notice that there will always be rival speculative ideas and that is why one must be thorough in looking at the literature and using your basic knowledge and experience to open up the situation in order to at least have a credible theory as to the most probable solution route otherwise one might just waste time on chasing nothing of value.

Do not let this idea run away – this is not about natural laws of the universe such as Ohms law or Archimedes Principle – here one tries to establish a personal belief about a situation and its problem theme. So after speculation one might express ones personal theory about the above example as follows.

It is believed that implementation of application software is proving difficult and this may be due to poor implementation strategies. It follows that if this is the case and better strategies can be defined then implementations may prove more useful in the future.

Notice that my theory points to a particular form of answer to this problem theme and in this case it is related to perhaps a document that explains how to formulate implementation strategies based on a consideration of user needs, application intention and business objectives.

Occasionally, the theory may be embodied in a scientifically constructed hypothesis but more often than not in technological research it is expressed informally as an idea.

6.6 Primary Data

Primary Data is data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

6.6.1 Primary Data Collection Protocol

Within every project there has to be a collection protocol for the practical collection of the primary data. Every complete protocol will have 5 features:

Vehicle – this is the primary mechanism or technique employed by the researcher, typical examples are: interview, questionnaire, observation, role playing, seminar, focus groups, document searching and so on

Recording Profile – this describes how the data will be physically recorded. Typically we might use: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria –this is a profile that allows the researcher to know that he/she has a valid sample point from which data is to be collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. If we do not have a profile we may not have any consistency in our data and it may therefore be meaningless.

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable.

6.6.2 Project Purpose in a Nutshell

Students sometimes get confused over what a Master's project is about. Consider a topic area like Digital Paper which is likely to be a very hot technology in 2006/7. A Master's project is not about producing a long narrative on Digital Paper explaining what it is, how it is used and what the technological infrastructure to support it might be. A Master's project is about identifying a problem theme in Digital Paper and then collecting and processing primary data into a form that helps you resolve that problem theme based on ones own personal theory. With this in mind, consider the following examples.

Example 1. Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them – is that primary data and is this a valid research purpose? No because in the first place one might just regard the manual as listing the functions anyway so in effect the data already exists, secondly, this is just one book and so its content might be complex, trivial or totally unrepresentative.

Example 2. So if I extract (my basic activity) instances of phishing (my problem theme) from an email log that would be primary data because even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data) as a collection did not. My purpose being to process this collection of primary data to find out the most common sources of phishing and express my findings in an evaluatory report (my form of answer).

Example 3. If I conduct interviews in order to describe (my basic activity) a user purpose regarding illegal downloads (my problem theme) in my company with selected employees the interview transcripts are my raw primary data because the transcripts did not exist before the interviews took place. My purpose being to process this collection of primary data in order to develop a policy (my form of answer) to control illegal downloading activity.

Example 4. If I look through written reports (secondary data) on security violations (my problem theme) for a particular company with a view to identifying (my basic activity) the root cause of each violation then even though the violation reports exist the list of root causes (my primary data) did not so it is primary data. My purpose being to process that collection of primary data to create a strategy (my form of answer) that will alleviate or remove certain kinds of violation in future.

Example 5. If I plan to build an application for processing student MSc marks (my problem theme) then I need to ascertain (my basic activity) the system requirements (my primary data). My purpose being to process this collection of primary data to create a design (my form of answer) for the marks processing system.

6.6.3 Pre-processing Primary Raw Data

In many cases it will be necessary to process the raw data that one collects into a structured form of some kind so that is easier to use when generating the final project outcome. For example, if we have a series of interview transcripts it is obvious, that in that form, they are not easy to use so we might perform a pre-processing phase to get the core data into more structured form that then constitutes our primary data collection before the main processing phase that generates my project outcome is carried out. For example, suppose I examine company documents on misuse of IT system resources by employees. In this case I might proceed in two ways to get my structured primary data collection.

In line processing – that is I define my structure before I start and then as I come across a misuse example I structure it there and then. However, the disadvantage here is that you have to continually look back to see that you are not recoding the same data again and again from other incidents and so it tends to disrupt the collection process and make it longer to complete.

Pre-processing – here I wait until I have been through all the documents and then I use my set of notes to systematically work through the whole raw collection and form my structured collection that way.

6.7 Writing a Research Question (Study Projects)

This is intended to relate to the core problem that your research is trying to resolve. Make sure it is a clear question. Ideally one wants an open question: that is one that does not just end with a yes or no answer. This is often quite difficult to achieve but it can be done if you work at it.

A question is an expressions normally used to request information the form of an answer. Questions can sometimes be like commands used to elicit a response and others such as "Would you pass the salt?" looks like a question but in fact is a request or action, not for an answer. In Research Methods, however we will only look for questions that elicit information.

The simplest questions implicitly or explicitly request information from a range (finite or infinite) of alternatives and these are often called bi-polar questions. An interrogative word is a word used to start a question. In English the following is a list of interrogative words although some of them are rather old fashioned now.

Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.

6.7.1 Questions that are not Questions

It is often difficult to write something that in English could be taken as a question. Now I am sure that in daily life everyone knows how to ask a question but when you write something down you are entering another world. Consider the following two lines – would they be understood as proper questions?

How to sharpen a pencil? Or What a pencil can do for you as a student?

Now these clearly ask for information but if you spoke these fragments to someone they would not quite see it as a proper question – in English such fragments would be understood as a kind of heading to a list of instructions for sharpening a pencil or a list of the benefits of using a pencil.

6.7.2 Basic Research Question forms

It is best when attempting to construct a question to think about what sort of answer is to be expected – now in normal everyday life we do this instinctively. For example, you would not say "is this the right way to Pablo's restaurant" if you wanted actual directions because that question form could only give you a Y/N answer. Instead you would probably say something like "how do I get to Pablo's restaurant from here" and reasonably you would expect an explanation to that question. Broadly speaking there are four sorts of answer:

Bi-polar answers - Essentially questions that imply a limited range of possible answers. Typically, a bi-polar question starts with a word such as WHAT, IS, CAN or DOES.

Is it possible to sharpen this pencil? (Y/N)
Does it make sense to allow children to sharpen pencils (Y/N)
Can a blue pencil be sharpened easily (Y/N)
What is the correct pencil weight for drawing a picture? (HB1, HB2 etc)
What is the common view of staff about using blue pencils? (Disagree, agree, etc)

Bi-polar questions can of course be useful but more often that not they have no great utility and the answer is obviously yes or no. Consider the question: "Can a green pencil be used in place of a red one?" Well of course it "can" be used so the answer is bound to be YES and so the question is pointless. Sadly, questions in this form occur all too frequently in student work and whoever writes such questions is not thinking at all about what information he/she want to elicit.

Explanatory answers – where the expected answer is an explanation and it is often in the form of a procedure or process. Typically, explanatory questions that start with 'HOW' or 'WHY'. For example, "How can a pencil be sharpened safely by young children?"

Descriptive answers – where the expected form of answer is a description most often in the form of an evaluation. Typically, these questions start with WHAT or WHY. For example, "What is the purpose of HB0 pencils?" (a simple explanation) or "Why are HB0 pencils difficult to sharpen?" (an evaluation)

Exploratory answers – where the expected form of answer implies an answer as an exploration of something. Typically, exploratory questions start with HOW or WHY. For example, "How should we use HB1 pencils best in drawing figures?" (often an exploration is needed here leading to an explanation)

Good interrogative words to start questions are: what, where, would, in what way, can, is it, why, which, where, how, does, who, why, do, etc – whatever word you use always ask what form of answer is implied by each of them. You must be sure that whatever form you decide on as answer that you can actually construct it and when it is constructed as part of your research it is in fact useful strategically in some way.

For example, suppose I decide that the form of answer I want is “The role of technological innovation is business success”. Well the task you now have is to now ask yourself whether you know how to express a role (write it down if you like) and whether knowing about this role will be of any use.

6.7.3 Research Question – Why are we asking it?

In normal everyday life questions come at us more or less all the time. Sometime we just answer them but more often that not we have a tendency to ask “why do you want to know”? It is therefore always useful when setting out your research question to ask why you asking it. That is you say to yourself, if I have the answer to this question then there will be some good outcome because of it. Sometimes we embed in our questions why we are asking them but mostly we do not. You will see later however, that you will have to make the reason plain in the aim so one might as well think it through at the question stage as well.

6.7.4 Research Question Form of Answer

For any Research Question there will always be several possible forms of answer arising out of ones personal theory about a problem situation encapsulated in the question. Ideally one would like the research question to be worded so that ONLY one form answer is possible and that is the one our theory suggested but often that is not easy to do so one normally has a range of options and competing theories to choose from so one looks for a form that interests you or looks to have the most utility. Do not be tempted to have multiple questions all in one sentence or look for multiple answers since it is better to focus on one significant output form. Table 4 lists the main forms of answer to help you when considering your personal theory.

Category	Typical Interrogatives	Expected Forms
Bi-polar	does, is, are, what, when or can	A list of possibilities
Explanations	how, why, who or where	A report, a model, an equation, a theory, a design, an evaluation etc
Explorations	How, who or what	A list, explanation, a comparison matrix, a pattern, a survey report, a theory etc
Descriptions	What, who or why	A report, a process or procedure, a model, a policy, a strategy, a theory etc
Table 5. Research Question Outcome Possibilities		

6.7.5 Strategy for formulating a Research Question

There is no easy way to do this and no real templates for it either so a good formulation will require some clear thinking and effort. What follows is a typical structure that you might use, but do not feel limited by it, and neither should you worry too much about the order in which you present the following elements although it would be very odd not to have the interrogative at the beginning (**SPITS** for short)

Spotlight – try to put the spotlight on where the primary data or information needed to answer the question might help come from.

Problem – this is about focusing on a single problem, so try to be as concise as you can.

Interrogative – what is your key interrogative word (how, why, what etc). You should note that some interrogatives need to use two words if a proper question is to be formed. For example, “how” on its own will not normally make a question but when you say “how can..” it is clearly a question.

Target – think about what will happen in the real world if you can resolve the problem. For example, it might be your target was to gain efficiency improvements, provide or enable better communication, increased accuracy and so on. It is also possible, but usually unwise, to state the target negatively if this makes the wording of the question more natural and you will see examples of this in section 6.7.

Suggestion – here one thinks about the problem theme and simply asks what sort of answer and what form it might take. So sort of answer might be yes/no, an explanation, an exploration, a description and these sorts of answer might be expressed at the end of the project as a report, a model, a list and so on.

Here is a good example from student work - "How can the billing cycle time be reduced by identifying and defining best practice in order to improve the quality of response to customers by reviewing the initial accounting processes stages?" Notice here that we have:

Interrogative = what, **Problem** - billing cycle time, **Target** – improved response to customers and **Spotlight** – initial accounting process and **Suggestion** – a best practice portfolio.

It is not always useful to add in the data spotlight because sometimes it can limit ones speculation about causes and solutions and in any case, the spotlight is often implicit in the problem definition. It is also possible and permitted to add in what form of answer you expect to the question but normally I would advise against that in most cases and this is discussed in the next section.

6.7.6 Function of a Research Question

The function of the research question is to crystallise the problem and desired effect (target) of any solution. But doing this is only useful if it allows the research enough room to theorise or speculate about possible answers so that indeed the solution space can be explored. Consider the following formulation:

"What factors influences the development of sound IT project management working relationships?"

Here we have in a solution because we are told that the problem is "working relationships" and what we want as a target is sound working relationships. But we in effect we are told to look for factors and so the solution to this problem theme will be a list of factors. The trouble with doing this is that it cuts off any further speculation about dealing with this problem idea and so the question becomes rather pointless.

6.7.7 Meaning in a Research Question

This section has looked at the structure of a typical Research Question but that is all it is and students must not treat it as some sort of template – it **MUST** be thought out step by step and even then one has to think does it make any sense, is it a focused question, what sort of answer should I expect and so on – there is simply no substitute for careful thinking.

Once you have formulated your research question and have a good idea what form the answer will take then its time to test it using the following ideas. Now be aware that this is just a test of structure and of itself it does not mean the question makes sense – there is no way to do that other than using your own brainpower and common sense – if it makes sense to you it will probably make sense to whoever else looks at it.

English – does it read correctly in English as a question?

Paraphrase – if it's a good question you may be able to ask it in several different ways – so try to do that until you get a formulation you are happy with.

Bi-polar – this means that the question has a fixed and limited range of answers such as "Y/N", "bad", "good", and "excellent". This type of question can of course be useful but the problem with them is that such answers do not have much utility – that is they do not tell you anything of value in terms of what action or actions you might take. You are advised to avoid such questions for your project.

Discussion – look at your question and honestly ask 'will this question produce discussion?' – what this means is to ask 'who am I writing this question for and would it interest them'. Try not to think that you are doing this for your Research Methods tutor but try to think what you would do if you were trying to get funding for research to get an answer to the question from someone.

Answer Form – try to work out what form or forms the answer will take (typically: bi-polar, explanation, description or an exploration) – if you try to avoid this aspect you may find yourself in serious trouble with your research.

6.7.8 Common Errors in Research Questions

The following are typical errors found in student written Research Questions – they can all be avoided if one takes just a minute to think through what has been asked and what sort of answer is likely.

Not a Question - to an English speaker the following would not sound like a question, instead it would sound like a heading to a list of instructions or a procedure. "How to make business application development productive at XYZ Corporation?"

Multiple Questions – It is never a good idea to try to put TWO (or more) questions into one as in the following example - one is about testing and one is about bugs they are quite different things. "How can software bugs be minimised and the testing cycle shortened in the development process of an Inventory System?"

Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example and it is easy to see that the answer to the question is bound to be YES - of course a productive work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this. Similarly, it is easy to explain how a better development process can increase productivity.

"How can a better business application development process increase the productivity at XYZ?" or

"Can a productive work-life balance be achieved with telecommuting for technical personnel?"

Please remember that it is possible to write a very poor question that exhibits more than just one error type. Again, there is simply no substitute for thinking about what it is you have written.

6.8 Primary Data Generation with BAGeD

Based on a problem theme, theory and the form of the project outcome expected one needs to formulate a process to create a unified collection of primary data. There is no algorithm for doing this and one has to go carefully through the steps: define the data (BAGeD), locate the data and decide on a protocol to collect that data reliably.

Spotlight - The core of this primary data generation process is to find an activity whose execution effectively points to the right data so that you can formulate the whole collection plan around that activity. This core activity is called a Basic Activity for Generating Data (acronym BAGeD) and is the activity that one performs to generate the primary data that you want. Think of the BAGeD as a sort of spotlight that is focused just on the primary data that one needs and nothing else. That is the spotlight illuminates the data that you want in the sense it tells you how to generate primary data items but not how to actually collect that data.

With a BAGeD it is ideal if you can find just one verb to describe the activity. One needs to be careful here that the activity is clear since almost all verbs need to be qualified or supported by stating what the object of the activity is. For example, if I were to say, "look at fault logs for my primary data" then that is very indistinct because it does not tell us what to look for (the object of the looking). But if I say, "look at fault logs to describe instances of SPAM attacks" then I now have a more distinct activity because I know what I am going to write down as my primary data. The whole primary data collection process is then fitted around the BAGeD and the detailed planning to get the necessary data can then be made.

Example - suppose the problem theme is the value of training. Clearly a lot of money is spent on training so it might be really useful to know if there is a link between it and productivity. Suppose we speculate that the link is to do with essential business working practices and these change over time to meet new needs so that what I need is an answer in the form of a process model on how one identifies changes in business essential working practices and links them to a training initiative.

Now that I have my theory and form of answer (a process model) the Basic Activity for Generating Data can become **describe changes in essential working practices** of key operational staff – thus, my Basic Activity is "**describe**" and the Primary Data will be **changes in essential working practices**. In practice you might try several ideas before you are happy with one. Now I have this core activity I can work out the full process of getting to the data and processing the resultant collection to get my process model (outcome) that describes the link between business essential working practices and training.

Once the BAGeD is clear it, is an easy step to say how that data will be collected. In the above example I might use interviews with relevant staff. In summary the whole process becomes **describe changes in essential working practices** (BAGeD) using **interviewing** (collection protocol) with relevant staff.

6.9 Getting a BAGeD

The Basic Activity for Generating Data (BAGeD) then is an idea that allows you to spotlight exactly the data that you want. So we are looking for an activity and we hope that activity will shine a spotlight on the data. There are only three real considerations:

Problem Area Expertise – it is obvious that you need to have gained expert knowledge in the topic area and in the particular aspect related to the problem theme you are dealing with. In general, depending on the topic, this might include things such as: knowledge of the technology, management and usage processes. Unless you have thoroughly prepared by using literature reviews and/or other means you will simply not be in a position to know enough to be able to decide competently what data it is possible to collect.

Intended Outcome – fix in your mind what your Research Design is trying to generate as an outcome. With the above in mind, recall that whatever data you collect will be first formed into a structured primary data collection during the pre-processing phase, which follows immediately after collection, and then that structured collection will be used to generate your outcome.

Let us suppose the outcome is to be a set of guidelines, so you have to think what sort of primary data is needed to be able to generate the guidelines. This means you must know what guideline means and how one is constructed and that is where secondary data comes in. So in this case you might look at text books or journal articles to find a guideline model to use. Additionally, you would look at examples as well as look at any relevant company or international standards.

Collection Protocol – the last thing to consider is can the data be collected and if it so, what is the best way to do that. So it's not a matter of just choosing anything that comes to hand, it is a serious practical consideration based on a thorough and logical analysis of the sort of primary data that you want.

In the guidelines example above, the idea might be to use a questionnaire and one has to ask would a questionnaire allow for the collection of the data I needed. Let us suppose that the data we spotlight is: IT media and usage. Now it's obvious that a questionnaire can easily get media data but it is not clear how it could capture usage data so I might decide to get that information by interview instead because I want a much richer picture there. The point is that guidelines are largely about usage so that is where I must direct my effort.

To elaborate, usage is a complex issue and if you try to get it with a questionnaire you are going to have to have a very good idea what the usage processes are and so it may miss lots of things that are going on in the company setting. Whereas, if I use an interview, I have much more opportunity to explore the usage idea and that is what I really want.

6.10 Research Question, Form of Answer and BAGeD Examples

Consider the following further examples which focus on the BAGeD (your data spotlight) and linking it with some theorising or speculation about an expected form of answer. In each case several possible forms of answer are listed but in a research study only one would be chosen for further work.

One needs to be careful – this all sounds fine, even clever but a researcher must seriously consider if a complete process built around the BAGeD can be formulated in order to get at the necessary data within the time and other resources that are available.

RQ = What limits investment into e-applications for SMEs in Hong Kong leading to a loss of competitiveness?

- A list and description of investment constraints or
- A strategy to deal with the investment constraints or
- A feasibility report on e-application implementation or
- A post implementation review report or
- A prediction reacted to the effects of the constraints

Let us suppose that I choose a list and description as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on reviewing investment plans and the corresponding strategic plan in order to identify (Basic Activity) the possibility of an investment constraint (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect investment and strategic plans (secondary data) and by a process of review I identify and extract key investment decisions in the investment plan linked to a strategic plan. So my primary data will consist of a list of identified investment constraints, which I will need to explain.

RQ = How can IT operational criticality be monitored and controlled in order to build effective business systems?

- A process of data criticality categorisations or
- A user guide to data criticality or
- A DRP/BCP policy document or
- A report explaining how data and criticality are related

Let us suppose that I choose a DRP/BCP policy document my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on listing data categories and using these categories I review reported critical incidents related to data categories in order to match (Basic Activity) the category to the criticality of the incident (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect category data (secondary since they must exist in this case) and collect incident reports (secondary data) and by a process of evaluation of each report extract incident details and categorise them (my primary data). So my primary data will consist of a list of categorised critical incidents.

RQ = How can supply chain logistics be improved to provide continuity in manufacturing systems?

- A evaluation of a modern supply change process or
- A feasibility report on RFID or
- An implementation plan for RFID or
- A model that shows how improvements may be made using RFID

Let us suppose that I choose a list of implied benefits all explained as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on describing (Basic Activity) supply chain tracking problem themes (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify tracking problem themes and by process of evaluation of each problem theme I analyse how RFID might alleviate that problem theme. In essence I extract key reported problem themes and possibly categorise them (my primary data). So my primary data will consist of a list of categorised problem themes in supply chain tracking.

RQ = How can an improved personal communication protocols be established leading to productivity and business success?

- A feasibility study on IM and its use in offices or
- The definition of a training programme or
- A series of factors that must be in place before IM adoption or
- A cost/benefits report or
- The design of a regular monitoring scheme to assess effectiveness

Let us suppose that I choose a cost/benefit report as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on analysing (Basic Activity) call content with regard to costs (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify the sort or calls and then extract the cost (easy) and assess the benefit (hard) and by process of evaluation arrive at my report. So my primary data will consist of a list of calls and their associated cost and benefit.

6.11 Writing an Hypothesis

This matches with your research question and amounts to you saying what you think to be true in a given situation. It is in essence an extension of your form of answer where you try to say not only the form but what you think the answer will actually be. When you do this your work then become a process whereby you try to show that your hypothesis is valid. It is quite difficult to write a suitable hypothesis. There are three stages: firstly write the null hypothesis, secondly write the alternative hypothesis and lastly write down the dependant and independent variables. Unfortunately many new researchers seem unable to do these things satisfactorily. Let me illustrate.

A student wanted to write a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (Dependent). Now this will ONLY makes sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified. Now in research people tend to treat the idea of hypothesis in two ways and the second way is often quite valuable in many research situations.

6.11.1 Formal Experiment

To set up a formal experiment one creates or identifies two samples: one exposed to some effect and one not. For example, suppose I were looking at whether a new diet called lose-weight-quick worked or not. I could set it up a hypothesis and look for samples where some people were exposed to the new diet and some were who were not. The experiment then amounts to seeing if there is any significant difference between these two samples. (See notes for how to set up a formal hypothesis)

In a sense we are trying to prove the diet works but that notion of proof needs very careful understanding. The point is that it is very likely that the diet will work for many in the sample and not work for others. So our proof carries a qualification which is that all we could reasonably say at the end is that the diet is likely to work for a large number of people (or not as the case may be). A second point is that we do not usually do thousands of similar experiments and so at best our results for a limited sample would be tentative. Notice that this outcome is quite different from an experiment that sets out to verify a natural law like Archimedes principle or Ohms law where the amount of variety is much, much less and of course such natural laws have been tested many thousands of times so we are assured of their validity.

6.11.2 Informal Idea

Instead we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies to demonstrate this. Notice that we are NOT proving anything here only suggesting that something may be true.

6.12 Writing an Aim and Objectives

For each project we want one overall aim and a set of objectives that collectively will generate the form of answer that has been defined (project outcome). An aim/objective is expressed as an activity to get to a defined and measurable outcome within the scope of the project. The essential difference is that the aim expresses the target (or purpose) for the whole project outcome whilst objectives perform the same function within the project itself. Every time you write an aim or and objective you have to ask three main things with the abbreviation JOB – so when you write an aim or objective make sure you do a good JOB of it.

Can Justify – this really amounts to asking if the aim/objective make sense in that it generates a minor project outcome within a particular aim.

Can Observe - Make sure than someone else can observe or check what you have done, normally this means you can document it in some way (in words, diagrams, charts, graphs etc) in your project document. For Engineering projects this also means that the application is visible to all markers.

Can Build - Make sure that YOU can build the outcome stated.

6.12.1 Project Aim

This derives from the project problem definition and is best thought of as expressing the overall activity and intention of the project to generate an outcome that can be placed in the project document or made easily visible to the examiners. It has a number of elements as follows although when you write your aim you do not have to do it in the same sequences as expressed here and you may write it in any way that best captures your ideas although doing it in this sequence tends to be more logical.

You will note in the aim structure that follows that the problem theme is not explicitly mentioned and we infer what it is by looking at the target. The reason it is not included explicitly is that when one does one tends to get very awkward constructions linking problem and target so we might see absurdities such as “to improve website accessibility because web site accessibility is problematic”. The structure of a good aim is as follows where we can use the acronym ASOT to remember it.

Activity – what must be done with the available data to get the project outcome? Ideally, look for a single activity that sums up the whole project process for generating the intended outcome.

Spotlight – where will the basic data used by the activity come from?

Outcome – this element says how the project outcome will be expressed knowing that this outcome will later be used to generate the real world target. If the Research Question expects a model as an answer then the aim must have the same form of generating the model. Similarly, if the application description states a system to do X then the aim must have the intention of generating system X.

Target – what is the real world intention? That is the project outcome should be useful in the sense that it addresses the real world problem theme on which the project is based.

Aim – to create a website structure design using cascading style sheets in order that it might be used in design to improve web site accessibility.

Activity = create, **Spotlight** = cascading style sheets, **outcome** = web site structure design and

Target = to improve accessibility.

Sample Aim 1 – “To create an improved network infrastructure”. This is unsatisfactory because we have no target - we know that there will be an improved infrastructure but we don't know what effects that will have. So is improved infrastructure the outcome – it cannot be because it would imply sending to Portsmouth for marking some object called “improved infrastructure” and that is an absurdity. So here we have no target and no outcome and we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

So if I just use the above example it would be possible to have a target of a reduced network down time because of the Improved network infrastructure but that could ONLY happen after the project completes and in the project one could generate an infrastructure design - now that can be completed within the project period and later used to build the infrastructure which can then be used to generate our reduced network down time. Another factor here is that we cannot measure whether something called improved network infrastructure (what scale would we use?) has been achieved unless we have a target such as reduced down time which of course we can measure.

Sample Aim 2 – “To build a Wi-Fi implementation strategy”. This is unsatisfactory because although we know the project outcome is an implementation strategy we do not know what value it has in the real world because we have no target. Notice also we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

6.12.2 Project Objectives

The aim expresses the overall outcome for the project but to get there we normally have to pass through a number of minor outcomes on the way and these are expressed as being generated by objectives. For example, an objective that sets out to build a model of the software construction process could easily be a minor outcome for a project dealing with the construction of web sites but could also stand on its own in the sense that is a useful outcome whether the project is completed or not. Conversely the design of a set of interview questions is most likely not to be an objective but a simple project task since it is something that needs to be done but only has meaning within the project.

Since we are looking for minor project outcomes that collectively deliver the project outcome we have a little problem here because any project is made up of a series of tasks, some of which will generate a minor project outcome and some will not. For example project tasks range from preparing the contents list to evaluating the project outcome. A possible rule for deciding if a task leads to an objective is:

Ask is the object produced by the task something that could stand on its own outside the project and in that sense valuable in its own right?

If the answer to the first is “Yes” then it is likely to be a task that leads to an objective. Please take care; this is just a “rule of thumb” so look for things as minor outcome that are real milestones to getting the project finished. It may be useful to think of the project as a pyramid where the final project outcome is at the top and below it are layers that have been generated progressively from objective minor outcomes so that we eventually get to the top.

The format for an objective is much the same as for an aim but with no target and two added features in that they must be progressive and bounded. There is only one aim but there may be from 3 to 6 objectives that show a progression that leads us to the overall project outcome.

Progressive – objectives must build sequentially so that collectively they amount to reaching the aim.

Activity – Ideally we look for a single activity that will generate a minor project outcome that can be expressed in a form that can appear in the project document

Spotlight – what is the data area focus of the objective's activity?

Outcome – In this element you say how the outcome of your objective will be expressed knowing that this must be in a form that can be written into the project document.

Bounded - objective outcomes must be achieved and available within the project period and must not refer to anything that might occur after the project document is completed and submitted

Example – To model and document the software development process.

Activity = model, **Spotlight** = software development process, **Outcome** = a document, Bounded – yes we can do this activity within the project period (in this case we cannot show progression as that only applies to the complete collection of objectives)

It is easy to become completely muddled with objectives and one source of this muddle is the distinction between a project objective: one about what a student can do and evidence in the project document and operational ones: those that have some real world effect that might happen after the project has been completed. In simple terms if you set an objective in your project it must be completed within the project's time scale. Let us just take an aim and look at some possible objectives.

Aim = To report on how the bicycle is an aid to mobility in a modern urban environment

Sample Objective 1 – “To list in a report the components of a modern bicycle”. This is fine since clearly it is something that you can do and evidence in a project document so somebody else could check what you have done.

Sample Objective 2 – “To describe how a bicycle functions”. This is no good since although it is clear that you can develop a description, no one can check it unless you write it down. Better to say “To describe by means of annotated diagrams how a bicycle functions”

Sample Objective 3 – “To understand how a bicycle helps urban workers”. This is no good because although you can do it no one else can check it. Better to say, “To prepare a report explaining how urban workers could be helped by the use of a bicycle”.

Sample Objective 4 - “To ensure that workers get to their office on time by using a bicycle”. This is no good because you cannot do it and if you cannot do it no one can check what you have done. It also sounds more like an aim than an objective because it hints at a target. Better to say “To report on bicycle usage strategies that might be applied by urban workers to ensure they get to work on time”.

Sample Objective 5 – “To implement a bicycle repair system”. This is no good since you can clearly do it but it cannot be checked in your project document. But you could say “Report on the implementation of a bicycle repair system” or “Produce a design document for the creation of a bicycle repair centre”.

Sample Objective 6 – “To ensure that bicycles conform to BS 7898”. This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written “To prepare a report showing how a bicycle can be evaluated for BS 7898 compliance”.

6.13 Words needing care in Aims, Objectives or Research Questions

The key thing is to look at the main verb (activity) you are using and ask ‘does it tell me what to do as a practice’, if not then its use is suspect. A good way to assess if the verb is strong enough is to connect it with an outcome. So we might write ‘Create a framework...’ – here we have the activity ‘create’ and the ‘outcome’ a ‘framework’ and it is easy to see that it can be done.

6.14 Writing a Title

The title is the name of your project – rather like the name of a novel, something that catches a potential reader’s attention but just gives a hint as to what the work is all about. Think of it as a kind of nickname or slogan for your project and as such it is not a good idea to try to use the same set of words for the title, Research Question and aim. Titles typically have two elements:

Aspect – this is the particular focused area of your study

Why – this says why it might be a useful aspect

Mentioning the means by which you solved your problem should only be included in the title if it is crucially important. As an example, suppose your project was concerned with the development of a database and you used Microsoft Access. Unless your project compared your product with a similar database implemented in Oracle, say, then the tool you used to solve the problem is not as important as the problem you set out to solve.

Be careful with titles, there is a tendency to use the title to say what you will do. The purpose of the title is to give a concise name to what you do. Avoid noise words or phrases such as: “A report into...” (redundant: of course it is a report!) or words like “study”, “investigation”, “enquiry” and “development” are often similarly just noise. It is also usually very unwise to express the title of your project as a question although a title in the form of a proposition is often quite useful as in example 1 below. Here are some examples of good titles:

Planar Similarity – A Possible Software Quality Measure
Heuristics in the Stages of Soft Systems Methodology
A Taxonomy of Heuristic Problem Solving

7. WORKBOOK 7 – BASIC RESEARCH METHODS CHECKLIST

In research we are usually trying to do one or more of the following: understand something, explore something, describe something, explain something, improve something, build something or prove something. To do any of the above, you will have to decide what data you want to collect and choose rationally a research method as your primary research vehicle and build a research design around it.

You need to exercise care here so as not to become confused between a Research Method, which is a framework or model for the whole research project, and Data Collection Protocols, which are vehicles for actually collecting the primary data and might include such things as interview, observation, questionnaire, seminar or role playing.

What follows is just a summary of the methods and further information can be found in the associate project notes and there are many books available on each of the methods listed below. There are many research methods but the list below presents the major ones.

7.1 Research Styles

This is a practical notion and you would be wise to think project ideas through in terms of these styles. There is no sense that one or other is superior and no reason why both should not be applied at the same time.

Quantitative – a style that represents information in numerical form. The numerical form might be graphs and statistics which can be used to show trends, comparison and similarities and the graphs might lead to equations which link variables or allow one to make generalisations.

The advantage of quantitative data is that there is solid evidence that can be permuted in a variety of ways to support or not support a contention. In general, one is counting the frequency of some event – say the number of times the user selects the wrong icon but, and it's a big but, the data is only truly valid in the context in which it was collected so one needs extreme care if we want to generalise.

Qualitative – is typically used to analyse how certain actions occur not just how often they occur. The information is usually represented in textual form of some kind as a description of some observable event or events. The usefulness of this is that it exposes the thought processes or reasoning behind a particular behaviour – why a user clicked the wrong icon. However, it does make the analysis and representation of the data more complex.

Although these are defined, in practice one does not usually start by thinking about the style and typically as you think about the problem and what primary data your research will collect to deal with it then it tends to define itself as predominantly quantitative or qualitative.

7.2 Research Approaches

There are two broad approaches to research, which is always essentially exploratory. In practice you do not decide the approach as such and it will effectively be decided for you when you formulate your research problem and construct your research design. However, we may loosely define:

Deductive – in the sense that we have a theory that we want to prove – in simple terms deduction amounts to a valid argument – that is if its premises are true then the conclusion automatically follows. Typically we form what is known as a null hypothesis. That is we set up our research question in the form that there is no effect of some parameter. For example, I might want to look at the significance of scripting languages on system development time. I could do this by setting up a null hypothesis that says 'I contend that the use of scripting languages have no effect on system development time'.

Inductive – in the sense that one hopes that the theory emerges from the data analysis as we go along. It follows that we don't have a hypothesis we just know that we want to explore a certain domain to see what emerges. For example, I might want to investigate the fact that students are not attending chat sessions but I have no idea why (I don't have a theory) so the whole point of doing the research is to explore the issue implied by the question and hope that something will emerge as I go along. So induction is a kind of grounded argument, the truth of whose individual premises would not *guarantee* the truth of its conclusion, yet one hopes that it would provide some evidence for it.

In short we might say that deduction is an outlook we take when we are sure that we know what the outcome is going to be but Induction is an outlook we take when we can only feel probable about a given outcome.

7.3 Research Outlook

Before we look at the various research methods it is useful just to records that there are two approaches that are available to a researchers.

Hypothesis Driven – this is the classical research paradigm where we have by some means devised a theory or speculation of some kind and the research is then directed at trying to show that the theory or speculation is valid. For example, we might theorise about who buys Gel Pens and then try to show that it is true, or more usefully try to explain in a report why it is true

Data Driven – it often happens that when we embark on research we don't have a hypothesis which we are setting out to test. This is very common today where corporations have vast databases and want to see if there is anything useful in there that might for example lead to competitive advantage. It follows, that in these cases we don't start with a hypothesis but we examine the data sets looking for patterns or outliers or indeed anything that might allows is to formulate a theory of some kind. For example, we might look through millions of sales transactions and then to hypothesise that people who buy Gel Pens all have beards and wear glasses. If this theory is true we can better target our Gel Pen products.

7.4 Which Method to Use?

There are many methods/models that we can use for setting up a research idea, the most common being: case studies, vignettes, action research, experiments, quasi-Experiments, surveys, biographies/histories, grounded theory, ethnography and requirements gathering. It is never easy to decide on a method or perhaps more than one method, but the following may help you to make up your mind. Start by asking what exactly are you trying to do or find out? This will help you decide whether you need a qualitative or quantitative approach. So here are something you might consider:

Choosing a method will depend on many factors such as: context, available literature base, basic research purpose, is the domain changing rapidly, time available, skill available, sampling and other practicalities, access, your personal stylistic inclinations, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on. Notice these factors are almost all about practical things - the whole point being that a design has to be carried out and that means it has to be practical.

7.5 Research Basic Purpose

In research, usually we try to do one or more of the following: understand something, explore something, describe something, explain something, illustrate something, improve something, build something or prove something. It is therefore very important when you are trying to decide on a method to keep this basic purpose uppermost in your mind.

7.6 Rationale: Case Studies

The case study method focuses on just one, two or twenty examples – such as your place of work, or one element of your organization or several aspects of a problem area. Typically:

1. Case studies are commonly used to **illustrate** or **understand** a problem or **indicate** good practice.
2. Case studies always have a context so make sure you are aware of it.
3. Case studies are usually qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain or describe some activity or phenomena.
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. There are broadly speaking two ways to begin case studies. This first is that you can set criteria and then go looking for relevant cases or secondly you can design and create the cases.
7. For most case studies there is usually be a longitudinal element - that is the cases will run over a fixed time period and you will periodically visit each case to collect the data.
8. There are several kinds of case possible:

Unique – implying that the setting and context are extremely rare and there may no be another chance to study this problem area again.

Critical – implies an important theory that you want to test and a particular case fits that profile.

Representative – implies that the case profile represents a typical or everyday situation.

Revelatory – implies that the case profile allows a researcher to study a situation never before looked at in detail and its context may be come common.

9. In practice you can use the following to organise your cases but remember once you have your case design you will need permission from whoever is necessary.

How many cases – be practical because there are time limits.

Case Criteria - add as many criteria as you think necessary to pin down the data location but don't have so many that you will never find a case that fits.

Sample criteria (collection protocol) – add as many criteria as you need to pin down a particular sample point where a unit of data can be obtained.

Visit Frequency - each case must be visited to get the data so work this out by looking at how much total time is available for the study.

Data collection Vehicle – by observation, interview, document analysis, etc. You will have to have a protocol to say when a valid sample arrives.

7.7 Rationale: Vignettes

These are perhaps best thought of as micro case studies or snapshots that illustrate just one idea and almost always are qualitative in their application. Typically:

1. Vignettes are commonly used in research contexts where actions, motives and judgements are to be explored, often in sensitive situations and you want to extract and **describe** examples or **illustrations** of significant elements in that problem domain
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain, test an idea or describe some activity or phenomena.
5. Typically you cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept. Therefore, this may also be useful when only a small sample is possible.

7.8 Rationale: Action Research

The main purpose of action research is to improve identified practice in some way. Typically:

1. Action research is commonly used to conduct research at the workplace with a strong desire to **improving** aspects of your own or colleagues' work so
2. In this kind of research you must be in control of events and they must be contemporary.
3. Typically indicated as useful when the research question starts with 'how' and there is a desire to explain something and use that explanation to improve practice.
4. Because of its setting, it is obvious that the research design is linked closely to its context.
5. The whole point of doing action research is the research leads to change in practice.
6. The working strategy is: plan something, do something, observe the something and reflect on what has happened as a result of your actions.

7.9 Rationale: Experiments

This form of research is used where there is a hypothesis and an associated variable that you can control (the independent variable) that will produce a change in some other variable (the dependent variable). That is the whole idea implies that you can intervene by altering or controlling the independent variable. Typically:

1. Experiments are commonly used when you want to **prove** or at least **indicate** that something is true. In practice proof is very difficult as it would imply that your findings are true for everyone, everywhere and for all time and so then tendency is to say indicate rather than prove in most cases.
2. In very simple terms one forms two groups: one which is exposed to the intervention and one which is not and then we observe if there is any difference because of the intervention.
3. Typically indicated when the research question starts with 'how' or 'why'.
4. The researchers must be in control of the events being looked at and they must be contemporary.
5. The biggest risk is that there may be other variables involved which we are not aware of.
6. It is difficult to be sure that our sample is representative.

7.10 Rationale: Quasi-Experiments

This form of research is used where there is a hypothesis and associated variables but you cannot control any of them. It would be nice to think we always had time and resources to run a carefully designed experiment but unfortunately this is often not the case. In an experimental design one chooses the samples involved randomly and thus one has control. However, it may be that data already exists and you can test your theory on that existing data or it may be that you simply cannot get control over all the variables that you want. So an experiment and a quasi-experiment are very similar it's just that the quasi-experiment does not quite have all the trappings that a full experiment has.

7.11 Rationale: Surveys

This form of research is used when we want to ask a group of people a question or questions. Typically:

1. Surveys are commonly used when one needs to get and express an overall **understanding** of the properties in a given domain.
2. One could of course also survey 'things' as well as people.
3. Surveys lend themselves to future replication.
4. Typically indicated when the research question starts with 'who', 'what', 'where', 'how' many' and 'how much'
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. Questions must be well-designed and unbiased and may be asked by interview or questionnaire.
7. Be careful to distinguish questions that are asking for facts and questions that are asking for opinion
8. The results will be very dependant on having a big enough and representative sample.
9. Be clear as to how the data will be collected – by observation, interview, questionnaire, etc. You will have to have a protocol to say when a valid sample arrives.

7.12 Rationale: Biographies/History

This form of research is used when we want to trace an historical event and analyses/evaluate its history as this may lead to insights or explain certain action so that lessons may be learned.

1. Biographies/History are commonly used to form a **description** and **explanation** of events.
2. One can use this to look at individuals or organisations or even technology.
3. Typically indicated when the research question starts with 'what'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. Be clear as to how the data will be collected – by documentary study and interviews are common.
7. Histories are naturally chronological and are characterised by epiphanies (pivotal events) and almost always exists in a context.

7.13 Rationale: Grounded Theory

Here the main idea is to use research to arrive at a theory based (grounded) on collected data. Grounded theory is quite difficult to understand and practice.

1. Grounded theory is used in situation where the theory is unclear or even unknown and so there is a need to **explore** seeking **description** and **explanations** in a domain.
2. One can use this to look at organisations or technology.
3. Typically indicated when the research question starts with 'why'.
4. You cannot control the events being looked at but the events need not be contemporary.
5. This is typically a qualitative study.
6. Be clear as to how the data will be collected – by documentary study, interviews, questionnaires etc.
7. Grounded theory is systematic in that the idea is to gradually move closer to a position where we can suggest a theory or proposition.
8. The basic unit of research is the category which is something that may represent a unit of information and might be almost anything.
9. The essence of grounded theory is in its data processing where various forms of coding are used to gradually unlock meaning in the data.

Open Coding – essentially the formation of the initial categories of information – it is characterised by looking for properties or asking when the something is a dimension of the research space.

Axial Coding – this is about trying to assemble that data after open coding. This can be done by using a diagram or some logic that connects things or looking for causes or looking for contexts and consequences.

Selective Coding – here the researchers invents a plausible storyline that integrates the categories in the axial coding model.

Matrix – a final step (though often omitted) is to produce a conditional matrix that is supposed to make clear the social, historical, technological or economic conditions that prevail in a situation.

Theory – one hopes that as a result of all this processing a theory will emerge which of course may go on to be tested by a formal experiment.

7.14 Rationale: Ethnography

This form of research is used when to immerse ourselves in the day to day life of an organisation or group. In this context ethnography is a description and interpretation of a cultural or social group.

1. Ethnography is commonly used when we want a reflective **description** expressed in an **interpretive** manner.
2. One can use this to look at individuals but more typically organisations.
3. Typically indicated when the research question starts with 'why'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. You may alter the events being looked at because you are normally a participant observer.
7. Be clear as to how the data will be collected – by participant observation.
8. Ethnography is about immersion in a culture: behaviours, language, structures and functions.
9. In such studies one often encounters gatekeepers, key informants and communication relies on a sense of reciprocity by investigator and his subjects.

7.15 Rationale: Requirements Gathering

Requirements are simply a statement of a systems service (what it must do) or constraints (what it does not necessarily do). In practice saying what a system must do is often extended to how it will do it. This method is a form of action research but it differs in that the only contact one has with the people involved is at the requirements stage and possibly at the implementation stage though this may vary depending on the systems life cycle employed. You should use this method when you are setting out to build an application of some kind such as a computer application. There are 4 stages of requirements.

Functional Requirements - These are requirements that say what a system does or is expected to do. Typically this would involve or include most of the following: process descriptions, details of all inputs/outputs and details of all the data that must be held in the system.

Performance Requirements - This is usually understood to mean requirements that describe aspects of the system that are concerned with how well it provides the main functional requirements. For example: performance criteria such as response times or how long it takes to print a report, data throughput and storage needs and security considerations.

Technical Requirements - This aspect of requirement looks at the tools and method used to build the system. For example, it may happen that you have to use a certain database package or for other reasons you need to select a particular scripting language and so on. More often than not this aspect amounts to looking at technical constraints that must be applied in building the system.

Usability Requirements - Requirements that ensure that there is a good match between the system and its users. In most cases usability is expressed in terms of measurable objectives.

7.15.1 The Requirements Document

The system and software requirements are usually documented in a formal manner so that ones understanding may be communicated to customers and system builders. The requirement document describes the following:

Services and Function – that the final system must deliver.

Operational Constraints - under which the system must operate.

Development Constraints - on the process used to develop the system.

Properties of the system - in the sense that it may have unplanned additional functionality.

Links - definition of other systems with which the system must integrate.

Domain - Information about the application - for example how to carry out certain tasks.

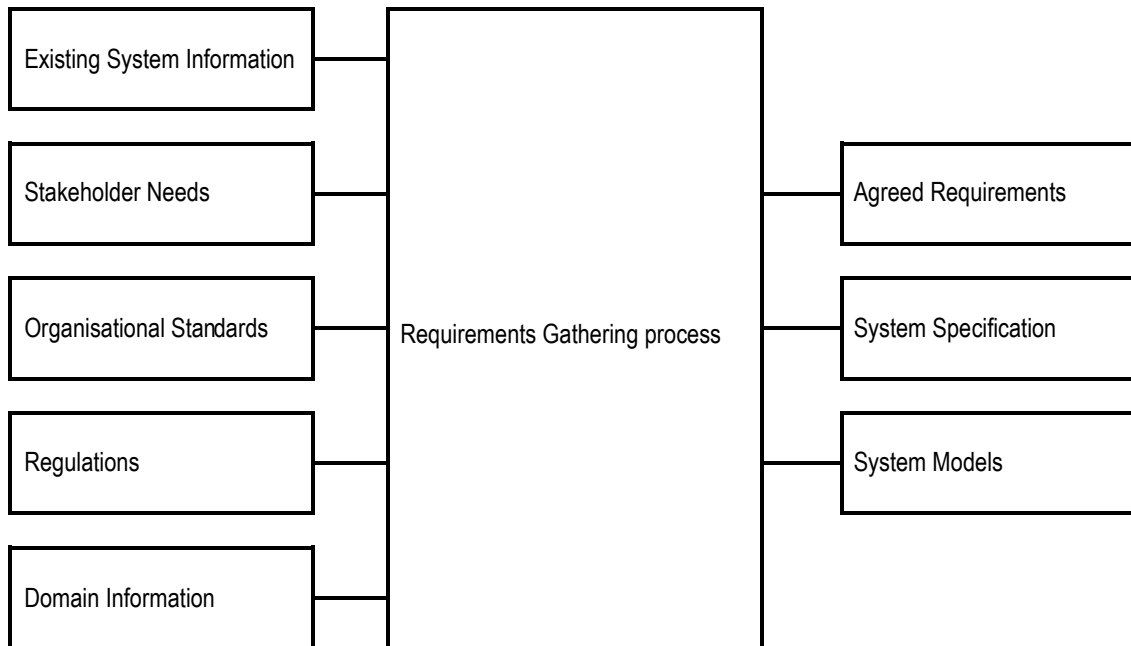
Definitions – acronyms, abbreviations etc.

7.15.2 Stakeholders

These are people who will be affected by the system and therefore should have a direct or indirect influence on the system requirements.

7.15.3 A Process Model

As a process model we might define the requirement process as follows.



7.15.4 Requirement General Questions

There are perhaps four general questions we might ask when attempting to gather requirements

Problem - What are the problems with the current processes?

Improvements - What are the improvement goals?

Reference. Kotonya, G. and Sommerville, I, (1997), Requirement Engineering, Wiley, ISBN 0-471-97208-8. This book is useful because it also contains excellent reading and reference lists.

7.16 Research Design

Finally, you must set out your research design. That is, explain how you will get your data – and this must be done in great detail. In summary, then, your research design is the blueprint of your research project which enables you to deal, systematically, with:

What questions to study?

What data is relevant?

What data to collect – you will need to work very hard here so that you can rely on your data.

Are there any practical limitations to what you can do

How to analyse the results – don't shirk this.

How to decide in which contexts your findings are applicable or can be exploited.

The main purpose of your research design is to help you avoid a situation in which the evidence you eventually collect does not address your initial question.

7.17 Research Process Development

It is quite common is many kinds of research but notably in Case Study and Action Research for the researcher's perceptions to change as data emerges. Often this will imply that the research design has to be changed or amended if it is to remain meaningful. These changes may be small such as a slight modification to the Research Question or aim but occasionally it may be necessary to make significant changes. For this reason researchers must always be careful in their design to allow a little flexibility if they can to accommodate possible unforeseen circumstances.

8. WORKBOOK 8 - BIBLIOGRAPHIC REFERENCING HARVARD APA

This workbook is a short summary of the APA style guidelines as contained in The Publication Manual of the American Psychological Association, 5e, 2001 (Subject Reference Collection: 808.02 AME).

The APA style is based on the Harvard referencing system whereby the date of publication follows the author name(s), and in-text references refer to items in the reference list using the author surname and date of publication, in brackets.

Referencing is important in all academic work as it indicates to the reader the sources of your quotations and borrowed ideas. Failure to indicate your sources is tantamount to plagiarism (literary theft). The purpose of the referencing system is to describe your sources in an accurate and consistent manner and to indicate within the text of your paper where particular sources were used.

Please note that there are two sections to this document:

How to **reference** correctly a source in the **bibliographic** section of your work

How to **cite** correctly a source in the **written** part of your work

Don't Get Caught Out! If you do not reference correctly you may lose marks or your work may be returned unmarked to you for correction. Therefore:

Keep a careful note of all sources used as you prepare your assignments.

Record all the details you need about a library book (including page numbers for any quotations) **before** you return it - someone else may have the book if you try to go back and check later.

Make sure you write down the source details you need on any photocopies or downloads you make.

Remember to print or save details of any website you want to refer to and record the date when you accessed the information.

8.1 Reference list (Bibliography) at end of Project/Dissertation

The reference list should be arranged alphabetically by author surname. The APA format requires book and journal titles etc. to be italicised, although we are not strict about that.

As a rule in projects and dissertations it is normal to produce two lists. The first is a reference list and that **MUST** only include sources you have cited. The second is a bibliographic list which includes all other sources you might have found but did not cite – this list is to allow the reader to explore the topic further if they wish.

8.2 Books

The details needed for a book can normally be found on the front and back of the title page. Make sure you locate the name of the publisher rather than the printer or typesetter. You need the name of the publisher in your reference list. Ignore any reprint dates; you need the date when the first, second, third edition etc. of the book was published according to which edition of the book you are using.

8.3 Journal articles

The details needed for a journal article can usually be found on the contents list, front cover or article itself.

8.4 Printed publications: Examples of References

The following are sample if how to correctly reference a source.

Book – pattern: Author, Initials. (year). Title of book. Place of publication: Publisher.

American Psychological Association. (1994). Publication manual of the American Psychological Association 4e. Washington, D.C.: Author.

Encyclopedia of psychology. (1976). London: Routledge.

Gardner, H. (1973). The arts and human development. New York: Wiley.

Moore, M. H., Estrich, S., McGillis, D., & Spelman, W. (1984). *Dangerous offenders: the elusive target of justice*. Cambridge: Harvard University Press.

Strunk, W., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

Note: Only list up to 6 authors. The 7th and subsequent authors are abbreviated to et al.

Edited book

Maher, B. A. (Ed.). (1964-1972). *Progress in experimental personality research* (6 vols.). New York: Academic Press

Article in edited book (Chapter) - The basic pattern for a reference to a chapter in an edited book (where the chapters have been written by several different people) is:

Author of chapter, Initials. (year). Title of chapter. In Initials. Name of Editor/s (Ed.) *Title of book* (pp.start and end page numbers of chapter). Place of publication: Publisher.

Vygotsky, L. S. (1991). Genesis of the higher mental functions. In P. Light, S. Sheldon, & M. Woodhead (Eds.), *Learning to think* (pp. 32-41). London: Routledge.

Encyclopedia entry - If the entry has no author, begin the reference with the entry title followed by the date of publication.

Lijphart, A. (1995). Electoral systems. In *The encyclopaedia of democracy* (Vol. 2, pp. 412-422). London: Routledge.

Government publication

Great Britain. Command Papers. (1991). *Health of the nation* (Cm 1523). London: HMSO.
Great Britain. Home Office. (1994). *Prisons policy for England and Wales*. London: HMSO.

Report

Birney, A. J., & Hall, M. M. (1981). *Early identification of children with written language difficulties* (Report No. 81-502). Washington DC: National Educational Association.

Conference paper in published proceedings

Borgman, C. L., Bower, J., & Krieger, D. (1989). From hands-on science to hands-on information retrieval. In J. Katzer, & G. B. Newby (Eds.), *Proceedings of the 52nd ASIS annual meeting: Vol. 26. Managing information and technology* (pp. 96-100). Medford, NJ: Learned Information.

Journal article - The basic pattern for a reference to a journal article is:

Author, Initials. (year) Title of article. *Title of journal*, Volume number - if there is one (Issue number), start and end page numbers of article.

Noguchi, T., Kitawaki, J., Tamura, T., Kim, T., Kanno, H., Yamamoto, T., et al. H. (1993). Relationship between aromatase activity and steroid receptor levels in ovarian tumors from postmenopausal women. *Journal of Steroid Biochemistry and Molecular Biology*, 44(4-6), 657-660.

Popper, S. E., & McCloskey, K. (1993). Individual differences and subgroups within populations: the shopping bag approach. *Aviation Space and Environmental Medicine*, 64(1), 74-77.

Weekly magazine article

Barrett, L. (2001, August 23). Daewoo's drive to survive in the UK. *Marketing Week*, 22-23.

Newspaper article

Caffeine linked to mental illness. (1991, July 13). *New York Times*, pp. B13, B15.
Young, H. (1996, July 25). Battle of snakes and ladders. *The Guardian*, p. 15.

Two or more works by the same author(s) with the same publication date - Where an author (or particular group of authors) has more than one work in a particular year, list them in title order and follow the date with a lower case letter a, b, c, ... For example:

Harding, S. (1986a). The instability of the analytical categories of feminist theory. *Signs*, 11(4), 645-64.
Harding, S. (1986b). *The science question in feminism*. Ithaca: Cornell University Press.

Anonymous works - If a work is signed "Anonymous", your reference must begin with the word Anonymous, followed by date etc. as normal. If no author is shown, put the title in the normal author position.

Note on source page numbers - Use pp. for page range only for encyclopedia entries, multi-page newspaper articles and chapters or articles in edited books. For articles in journals or magazines use the numbers alone.

Interviews and email messages - Because interviews and email messages are not considered recoverable data, you do not give details in your reference list. You should, however, cite an interview or email message within the body of your text as a personal communication: ...and this point was conceded (J. Bloggs, personal communication, August 22, 2001)

Legal References - Because the situation regarding legal references is complex and only US law is covered in the APA Manual, legal references will be covered in a separate guide.

Audiovisual sources: examples of references - Such sources are often complex but please note.

Films - The basic pattern for a reference to a film is:

Name of primary contributor - the director or producer, or both, Initials. (Role of primary contributor). (year). *Title of film* [Motion picture]. Country of origin - where the film was primarily made and released: Name of studio.

Reed, C. (Director). (1949). *The Third Man* [Motion picture]. United Kingdom: British Lion/London Films.

Spielberg, S. (Director). (1993). *Jurassic Park* [Motion picture]. United States: Universal Pictures/Amblin Entertainment.

If the film doesn't appear on the Library Catalogue, the Internet Movie Database <http://uk.imdb.com/> is a good place to check all the details needed for a film reference (follow the Company credits link to find details about the film studio/s involved). Alternatively, check Halliwell's Film and Video Guide.

Review of a film - If the review is untitled, put everything in square brackets in the normal title position and keep the square brackets.

Kinder, M. (2002). Moulin Rouge [Review of the motion picture *Moulin Rouge*]. *Film Quarterly*, 55(3), 52-59.

Malausa, V. (2001). Beauté du mensonge [Review of the motion picture *The Tailor of Panama*]. *Cahiers du Cinéma*, 558, 82-83.

Television programmes

Collinson-Jones, C. (Producer), & Dobson, E. (Director). (2003, July 14). Casualties of peace [Television broadcast]. London: Channel 4.

Single episode from a television series

This example shows the most complete information possible for a television episode. If details of the writer are unavailable, begin your reference with the name of the director.

Fraser, R. (Writer), & Geoghegan, S. (Director). (2003). Eyes wide open [Television series episode]. In P. Goodman (Producer), *Holby City*. London: BBC1.

Radio programmes

Portenier, G. (Producer). (2003, July 17). *Crossing continents*. London: BBC Radio 4.

Electronic sources: examples of references - The details shown below have been compiled according to the guidelines available on the APA Website (<http://www.apastyle.org>) in August/September 2001 (re-checked July 2003). Check this Website and the 5th edition of *The Publication Manual of the American Psychological Association* which is available in the Frewen Library for further guidance.

The basic pattern for a reference to an electronic source is:

Author, Initials. (year). *Title*. Retrieved month, day, year, from Internet address.
Banks, I. (n.d.). *The NHS Direct healthcare guide*. Retrieved August 29, 2001, from <http://www.healthcareguide.nhsdirect.nhs.uk/>

If no date is shown on the document, use n.d.

If the author is not given, begin your reference with the title of the document.

If a document is part of a large site such as that for a university or government department, give the name of the parent organisation and the relevant department before the Web address:

Alexander, J., & Tate, M. A. (2001). *Evaluating web resources*. Retrieved August 21, 2001, from Widener University, Wolfgram Memorial Library Web site: <http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm>

Deciding your future. (2000). Retrieved September 5, 2001, from University of Portsmouth, Careers Service Web site: <http://www.port.ac.uk/departments/careers/plancareer/deciding-your-future.htm>

Electronic journal articles which are duplicates of the printed version - Use the same reference format as for a printed journal article but add "Electronic version" in square brackets after the article title:

Lussier, R. N., & Pfeifer, S. (2001). A crossnational prediction model for business success [Electronic version]. *Journal of Common Market Studies*, 39(3), 228-239.

If you are referencing an online article where the format differs from the printed version or which includes additional data or commentaries, you should add the date you retrieved the document and the Web address (URL).

Articles in Internet-only journals

Korda, L. (2001, July). The making of a translator. *Translation Journal*, 5(3). Retrieved August 21, 2001 from <http://accurapid.com/journal/17prof.htm>

Use the complete publication date shown on the article.

Note that page numbers are not given.

Whenever possible, the URL you give should link directly to the article itself.

Break a URL that goes onto another line after a slash or before a full-stop. Do not insert a hyphen at the break.

Articles retrieved from a database - Use the format appropriate to the type of work retrieved and add a retrieval date, plus the name of the database:

McVeigh, T. (2000, July 9). How your gestures can do the talking. *The Observer*, p.7. Retrieved September 10, 2001, from The Guardian and The Observer on CD-ROM database.

8.5 Citing references in the text

There are basically two forms. The first is when the author's name is naturally part of the sentence and the second when it is just a reference. References are made from the text of the paper to the full details of the work in the reference list in the following manner:

It is a contention of the paper, and this contention is supported by Williams (1995, p.45) who compared personality disorders ...

When an author, or group of authors, has more than one publication in the same year a lower case letter is added to the date. For example:

In two recent works Harding (1986a, p.80; 1986b, p.138) has suggested that ...

With two authors both names should be listed in each citation e.g. Duncan & Goddard, (2003, p.99)

With three to five authors name all authors the first time, then use et al. (and others). For example: the first time it would be Moore, Estrich, McGillis & Spelman (1984, p.33) and subsequent references to the same publication would use Moore et al.

For six or more authors, use et al. after the first author in all occurrences.

Note that when the in-text reference occurs naturally within the sentence "and" should be used before the final author.

When a source has no author, cite the first two or three words of the title followed by the year. For example:

... in the recent book (*Encyclopaedia of psychology*, 1991, p.62) ...

... in this article ("Individual differences," 1993, p.12) ...

Web pages where no author is given

However, if the author is designated as "Anonymous", cite the word Anonymous in your text e.g. (Anonymous, 1993, p.116).

When using quotations in your text

Try to observe the following methods.

Gardner (1973, p41) stated that, "The relative importance of the systems may nevertheless remain in approximately the same proportion"

Smith (1991, p84) found that "...there is no evidence that chimpanzees can produce a drawing and discern the object represented in it..."

Occasionally, very occasionally you may need to cite a work that you discovered in another work because you cannot find the source then observe the following examples:

Smith (1970, p.27) cites Brown (1967) as finding ...

Brown (1967), cited by Smith (1970, p.27), found ...

It was found (Brown, 1967, cited by Smith, 1970, p.27) that ...

If you need to use this form your tutors must approve it and you must show that you have made every effort to track down the primary source.

9. WORKBOOK 9 – WRITING UP A RESEARCH PROJECT

This document is in several sections covering everything from project supervision to grading.

9.1 Your and Your Supervisor

The student supervisor relationship is very important if a high quality project is to be the outcome. As a rule the supervisor will be interested in the topic area and will want to be active in its development although you as a student must do the work. However, your supervisor will not be expert in everything but will usually have some knowledge of simple statistics and the four main research methods: experiments, action research, surveys, case studies and application development.

9.1.1 Student Expectations

The normal expectation is that students have of their supervisor are as follows:

- Only be available for consultation for a limited time.
- Only supervise what the student does and not do the work for them.
- Advise on research design, scheduling and literature surveys.
- Advise on theoretical, conceptual and methodological issues.
- Advise on development of research skills.
- Advise on data collection, processing and analysis.
- Advise on ethical issues if they are relevant.
- Read, evaluate and be constructively critical of student work if given sufficient time.
- Have a good knowledge of the general area you are working in.
- Be in contact with the student regularly.
- Arrange if necessary supervision chat sessions.

For project students on distance learning programmes it will be possible to have meetings in the WebCT chat room, using IM or Skype where a full and detailed interaction can take place. These must be agreed with your supervisor and must be planned not to clash with other classes. However, some tutor may allow student to contact them any time they are seen to be online.

9.1.2 Departmental Expectations

Supervisors take a formal role and certain attitudes and actions are expected. In general they will:

- Visit the discussion board and email regularly within WebCT (at least 3 times per week).
- Set a mail forwarding address to their personal accounts in WebCT email settings.
- Devote at least 6 hours to the supervision process spread over the project duration.
- Conduct one-to-one chats as required with project students.
- Conduct student/supervisor communication within WebCT or their personal email account.
- Respond to a student query within a certain time frame (normally no longer than 3 days).
- Be familiar with all the project guidance notes and workbooks.
- Be familiar with the project chapter profiles.
- Make sure students know if they are to be away for an extended period.
- Be aware that students may make contact through any one of their three WebCT accounts.

The essence of online supervision adequacy is based on the quality of communication between supervisor and student with the intent that we want the learning experiences to be exiting, stimulating and self-rewarding. In practice this means that communication must be frequent, lucid, critical and yet encouraging.

Supervisors should be aware that if they set email forwarding in WebCT they will effectively get an automatic alert when there is mail for them. If the student has also set mail forwarding then supervisors will be able to reply immediately otherwise they will have to go into WebCT. However, there is no alerting mechanism if a student posts a question into discussion so supervisors must visit the site from time to time so as not to miss any messages.

9.1.3 Supervisor Work Reviews

Supervisors will read your written work. However, when they do this certain rules apply:

Finished work – you should supply your supervisor with written work as it is produced chapter by chapter but it must be finished work. In this context finished work means that the format and content are the very best you can produce and in accordance to the guidelines found in this workbook. The tutor's role is not to act as some kind of filter for rough work or polishing multiple drafts which you want to improve in effect making them do the work for you. If a tutor suspects that the section you have sent in is not in its final form they will return it to you without comment.

Action on Feedback – if you are given feedback on any part of your work then you are expected to study it with care and commitment. However, it is up to you how to respond or even ignore what you are told but in all cases the consequences that follow are entirely your own responsibility.

Responding to Feedback – in all cases you are expected to respond to feedback. This may take several forms: writing to your supervisor saying that you don't agree with him or perhaps offering further explanation or as in most cases making changes to the content or structure of your project document. When you make document changes in response to feedback they are to be shown **shaded** so your supervisor can easily see exactly what you have added or amended.

Questions to Tutor - your tutor will not answer any questions regarding whether your work is right, wrong, is it a pass, what mark will I get or is it good enough. The only thing you can expect in this area is that you tutor may advise you that the work is not ready for submission to the university. If this happens it will be entirely your own decision whether to submit or not.

Response from Tutor - in most cases your supervisor will only suggest that you do something or ask a question designed to point you in a new direction. Normally, the tutor will not supply you with any project content since that must be provided entirely by you. The reason is that the work is yours not the supervisors.

Preparation - Your supervisor will expect you to be familiar with all the notes and workbooks contents. You should therefore be careful that you don't waste supervision time asking questions to which you already have the answers.

9.1.4 Chat Session

Chat sessions for project students will usually be one-to-one and are typically used when there are particularly awkward difficulties – chat will NOT be the norm during projects and your tutor will have no expectation that chat will be used.

9.2 Overview of Project Structure

Here are some general guidance notes – they are NOT suggested chapters but general content guidance on the project as a whole and have a sharp process focus.

9.2.1 Introduction summary

This is about the problem theme and its setting, client context, topic area, personal theory, Research Question or application functional description and intended project outcome, general research orientation followed by a well-defined aim and sound set of objectives. The introduction is to be precise, concise taking a discussion form that is explanatory and focused on giving readers a clear, coherent and comprehensive view of what the project is about.

9.2.2 Preparation for Research

This is your study of the topic area and research methods that you will need to know about. You will have to justify and explain the methods you intend to use; it is also your study of other people's work in the area that you wish to investigate - and a description of how you learned from their research.

Literature Review - What has been done before in this area - related to a particular problem theme and Research Question. This is all about preparing one's mind with all the topic area and research knowledge you will need.

Research Review - research into how the project investigation could be done and supported. At this stage student will already have an outline plan based on their approved specification but now the whole design must be thoroughly reviewed before actual work begins.

Knowledge of Alternatives – build a simple decision base which allows one to consider which methods could be used and how could they be used for this project.

Choices Made - which methods are to be used and rationally consider why they are good enough for the purpose.

9.2.3 Core Research

Here you execute the refined research design translated into a practical plan to obtain the collection of primary data and process it using acceptable methods into the intended project outcome.

9.2.4 Evaluation and Conclusions

This is the stage that looks at how one finishes off a project by a process of evaluation and the drawing of conclusions. In particular, it is needful to look at how one evaluates what was done and how it was done – that one needs to consider the project product (or outcome) and the project practice. For our purposes evaluating will be taken to mean reflecting on product and practice.

Many students confuse evaluation and conclusions but for a full consideration of the research work one must look at all project specific results and outcomes as well as practices and evaluate them and then perform the more difficult step of drawing generalised conclusion about both product and practice.

Evaluation of Project Product – the project outcome or product is normally evaluated against objectives, other existing products, using defined criteria or some form of expert evaluation. Additionally, one needs to be aware of any constraints that might have an impact on the applicability of the outcome

Evaluation of Project Practice - evaluation of project practice is more difficult than evaluation of project product and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way'. Additionally, one needs to be aware of any constraints involved, including time management that might have impacted on the use of best possible practices.

Conclusions - need to be considered thoughtfully as this is the point where one looks for implications and meaning that arise out of an attempt to generalise the findings.

9.3 Writing up your Project

The following sections describe elements that occur in almost all projects and which are generally important in constructing scholarly work. Do not be tempted to ignore these instructions – anyone who departs from the spirit of them may have their work returned for correction prior to formal marking.

9.3.1 Main Project Body Page Layout

The following example shows how each page of a project report should look, note that each chapter should start on a new page and that it is NOT necessary to actually say Chapter 1, Chapter 2 and so on as it is the heading that is important. Do not use numbering to greater than to three levels but you may use indented (but not bulleted ones) entries within a section at any level.

1. QUALITY CONTROL IN PROGRAM DEVELOPMENT

In this chapter the nature of quality will be discussed and its relation to physical measurable properties that might characterise quality.

1.1 INTRODUCTION

This project discusses a possible strategy for devising a program development methodology that goes some way to guaranteeing the qualities of the delivered system. In particular it will concentrate on just two aspects - that of developing generic designs and code and how such designs could be assessed for quality and function. The strategy is based on the simple premise as endorsed by leading authors in the field such as Blenkinsop, Wilson and Bowers that categories of problem can be identified and formalised. It is the contention of this report that such a process would more or less automatically:

Reduce - the complexity of the design process itself.

Ensure - the quality of the final product by:

Giving managers more control over the product development cycle.

Giving users more idea of the kind of system they are likely to get and much more say in what the shape of the product will finally be.

Releasing programmers from the drudgery of having to design the same piece of code over and over again, thus enabling them to concentrate their efforts on new

Formatting Note – you are encouraged to use these two forms of indenting: one with a heading in bold and one without as a means of structuring and indented section. The use of bulleted indents is not recommended anywhere in a project document.

1.2. Multiplicity of Design Factors

Every programmer has had the difficult experience of having to read and understand programs written by someone other than himself or herself. The sort of problem encountered may be aptly expressed in the following lines.

Everything has been thought of before, but the problem is to think of it again. (Goethe)

Many other authors, notably Frewin (1989) have discussed the notion of 'quality model ratios' and in essence this idea means that software systems have an implied model which can be accessed for

1.2.1 Multi-Tier Systems

In modern client sever systems

1.2.2 Interface Facades

In this case we look closely at the Internetetc

9.3.2 Plagiarism Checking

A software tool will check all your sources automatically and if plagiarism is suggested it will be dealt with very seriously since the reputation of the whole course and of the University is at stake. You must remember, that copying, paraphrasing, summarising and similar techniques where the material is extracted from a source must be properly acknowledged.

A simple rule is that if you use more than 6 consecutive words from a source it must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

9.3.3 Writing Abstracts and Identifying Keywords

The function of an abstract is to summarise your project, its context and its conclusions in order to give the reader an overview of the main project theme so that they can make an informed decision on whether they want to read the entire report. A good basic structure might be defined as follows but it will usually be limited to around 300 words.

What was the project about?

What did you actually do?

What were the conclusions?

It is normal to add keywords or phrases after the abstract to act as specific pointers to content. There are no particular rules about how to construct these words or indeed how many there should be but typically there are 5 or 6 and to be useful they must be chosen with care in the sense that they might in themselves be regarded as a sort of abstract of ones work.

9.3.4 Standard Appendices

Project reports MUST include the following appendices:

Your Project specification – it may be brought up to date from that submitted at the start

Your project plan expressed in an appropriate format

A glossary if this is appropriate

A full reference list of work that you cited

A bibliography (may be combined with your citation list)

Each Appendix should be introduced by a title where the number (12 in this case) should follow on from the numbering within the body of the report: **12. Appendix A – Project Specification.**

9.3.5 Typical Project Organisation

Below is a suggested organisation for your complete project.

Briefing Pages

Heading pages (examples follow later in the section)

Plagiarism declaration

Abstract for Report including keywords

Acknowledgements

Dedications

Content list (automatically generated) for all headings, tables and figures/graphs etc

Introduction:

Brief topic area outline and background to problem
Presenting Problem definition
Real World Target relevant to the problem
Speculation of problem causes and possible solution routes
Personal Theory on the best solution route
Research Question/Application Description
Discussion of expected project outcome
Scope of work
Aim & Objectives

Literature Research (see Workbook 5 for recommendation for various project styles)
Detailed consideration of elements that help you focus on your topic area

Research Design

Research Method and its rationale in dealing with the research question/application
Process to collect Primary Data
Processing of the Primary Data to get an outcome

Application Testing (Engineering project only)

Design of Tests
Test Results and conclusions to be drawn from testing.
Implementation plans

Results Discussion and Presentation (study projects only)

Discussion and presentation of results
Generation of intended project outcome

Evaluation (these are specific to what you did)

Detailed evaluation of what was actually done – your practice
Detailed evaluation of your project product/outcome including objectives not met
Met/Not met objectives

Conclusions (here one tries to generalise what was done)

Generalisations based on a consideration of both product and practice
It is also possible to examine the following minor conclusion elements

- Usefulness of literature sources
- Future work/development
- Relevant aspect of the course used during the project period
- Changes one would make if project were repeated
- What you have learned
- Value-added features

References and bibliography (see workbook 5)**Content of Appendices**

The following items must be in a set of Appendices. These may be bound separately if the composite document becomes too large (more than 100 pages).

- Code listings
- Project Specification and project schedule
- Inclusions (copies of relevant documents such as policies, invoice layouts, diagrams etc)
- Questionnaires.
- Summary interview transcripts
- Details test plans
- Requirement catalogues
- Glossary
- Other

9.3.6 Project Types Sample Outline Contents

Broadly speaking there are two kinds of project: engineering where you build an application of some kind and study based where one would investigate in depth some idea. Here are some sample contents lists that show chapter or section headings for the different project styles. However, if it is obvious that these samples have just been copied into your project with minor changes then your work will be rejected. See Workbook 9 section 9.3.5 for further general details.

Sample Study Style Report Contents	Sample Engineering Report Contents
Title: Internet Marketing – A Users View	Title: BrokerBase – Insurance Sellers Information System
Chapter 1. Introduction to Internet Marketing	Chapter 1. Introduction to System
Introduction and contextualisation IT marketing problem theme Problem Theme and target Speculation and Personal Theory Discussion and Exploration of Research Question Project aim and objectives	Introduction and Situation Overview Situation based Presenting Problem Application background and context Application overview Project aim and objectives
Chapter 2. Literature Review	Chapter 2. Literature Review and Application Scenario
Introduction to Internet Marketing Marketing Planning eCommerce Technologies and Tools Costs and Benefit Estimation Consumer Orientation and Market led operations IT supported Marketing and selling techniques Product, Price, Place, Promotion and Customer expectation IT supported Experiential marketing Security protocols and languages Auditing and secure payment systems	Outline of Insurance Brokerage practice Background Review of the Application Scenario Outline of Application Build Process and Tools
Chapter 3. Research Design	Chapter 3. Requirements Specification
Research Method Selection and Rationale Primary data collection process Data specification Data locations and expectations Collection Protocol Processing of Primary Data Collection Outline Results Project Outcome	Outline of the requirements (requirement catalogue into appendix) Research Plan for requirement gathering: functional, performance, technical and usability Outline Requirements catalogue Analysis and Evaluation of requirements
Chapter 4. Evaluation (Project Specific)	Chapter 4. System or Application Design
Evaluation of Project Outcome Evaluation of Research Methods and Protocols used	Principles used for this design Overall system design Build Process Overview Database design Component design Interface design including website
Chapter 5. Conclusions (Project Generalisations)	Chapter 5. System Implementation and Testing
Generalisations on the research Outcome Reflections on what was learned etc	Testing strategy Testing plans (detailed plan placed in appendices) Test results (detailed report placed in appendices) Application Implementation plans
	Chapter 6. Evaluation
	Evaluation of the application Evaluation of practice (methods and tools used)
	Chapter 7. Conclusions
	Generalisations based on the Application Reflections on what was learned Future work Etc
Notes	
1. Whatever the project styles the appendix must include: the project specification, glossaries, references lists, bibliographies. The appendices may be attached to the main report or they may be placed in a separate document.	
2. Remember these are just samples and you may well have different numbers of chapters and different heading and sub-headings	
Table 6. Sample Project Content Outlines	

9.4 Report Writing

In your research you will often have to write reports and of course you will have your final report to write. Reports are a special form of writing and therefore you need to note that reports are:

- Written for defined purpose.
- Written and targeted at specific audience.
- Written systematically to present your findings.
- Focused on what you have done.
- Information structured and formatted to lead reader quickly to main themes and findings

9.4.1 Structural Elements

The following tables are intended to give you some guidance on how to construct report in a scholarly fashion and in a way that leads to clear and concise presentation. It is important to structure all your work in a way that enhances its usefulness and utility. The following is a list of all the major structural elements, though there is no need to use all of them in every document you produce. The best advice is to choose a structure and then those elements that best suit the work in hand.

Structure	Description	Location
Title	A focused and short description of the document that summarises the deliverable element	Front page and above the contents list
Contents List	A short index based on the major chapters and/or sections	Before the main document begins but after the title page
Glossary	Used to list and describe special terms or abbreviations	Towards the end of the main document
Index	A detailed listing of all important words or phrases specifying location in main text	After the glossary if it exists otherwise after the main document
Appendix	For inclusion of explanatory notes, special documents or copies of originals	After the glossary but before the index
Footnotes	Notes at the bottom of pages and linked to pieces of text.	Immediately before the page footers
Headers	Standard text	Every page
Footers	Standard text	Every page
Keywords	Words or phrases used to form a simple classification of your work	Near front of report
References	List of all reference material in an approved manner	Toward end of document

Table 7. Main Document Physical Structural Entities

Organisation	Description
Chapters	Major elements in the development of the subject matter of the document
Sections	Minor elements in development of each chapter
Headings	Major Information Content indicators
Indents	Used to emphasise small but important points in the text
Bullets	Used to further emphasise an indented text
Tables	Used to represent important information concisely
Paragraph numbers	Used when it is necessary to reference all parts of a text
Page numbers	Used for indexing purposes
Diagrams	Used to show idea or data pictorially
Captions/Legends	Added to diagrams where necessary
Columns	Use when the subject material lends itself to such a view

Table 8. Main Document Structural Devices

Presentation	Description	Examples
Font	Letter style and size	May be proportional or fixed point
Renditions	Printed form of font	Bold, underline, italic, reversed
Orientation	Page format	Portrait or landscape
Form	Delivery form	Paper, electronic
Table 9. Main Document Structural Properties		

9.4.2 Report Writing Stages

There are a number of stages to writing a report and they require you to be focused on what you are trying to show as the core of your report.

What are your trying to show – this really goes along with the underlying purpose of your research question – typically this will be about wanting: to inform, to explain, to evaluate, to prove, to advise, to recommend, to predict or to bring about changes.

Collect and sift material – it is important to jot down ideas relevant to your purpose. These jottings will help you form an action plan for gathering information from other documents, visits, interviews, observation, surveys etc.

Note - information sources as you find them

Organise and structure the material - group your work into chapters, sections and sub sections. Make sure the order is logical.

Draft and edit/redraft – to get a good report you may well have to re-write it several times and this may include complete re-ordering. It is important that you need to be concise and use a formal language but it must be clear and concise. Use simple, straightforward words and sentence construction and make sure your spelling and grammar are faultless. Use clear headings and sub headings with bulleted indentations.

Thematic – make sure your work has clear themes that are easy to follow.

Plain English - do not try to be over-clever or fall into jargon.

Read Saunders chapter 13 pages 414 to 443. Don't skimp on this or I might skimp when I mark inferior work!

9.5 Summary and Advice

Your final project must have a strategic dimension. This does not mean you can't build some software but if you do it will be in support of a strategic objective. So whatever you decide to do consider:

Why it is being done but note it will not be sufficient to just say why, you will have to show evidence for your conclusion.

Cost/benefit is a useful idea but in most cases it is very hard to show benefits. In any case you need to look at other possible ways of showing that something is worth doing.

Don't forget life cycle logistics - that is what are the costs per hour (for example) of running a system for say a 10-year life.

Also look for impact for what you do. For example something might be cost effective but may have a negative affect on some business element.

Think through your ideas; don't be narrow - question everything.

Traditionally strategies are developed around two themes: needs - what are the business needs (at a high level) and what are the business values (what does it regard as important)

9.6 Project Submission Regulations

Successful project reports may lodged in the University library, it is therefore important that reports follow a standard binding format as described below. Project reports that deviate from these regulations may be penalised and returned to you for correction and in extreme cases, failed.

Submission - two full bound A4 portrait orientation copies of your report must be submitted by the defined dates. The report may NOT be submitted electronically – the copies must be sent by courier to reach us by the defined dates. However, you must also submit soft copies on either floppy disc or CD/DVD.

Presentation and Submission Checklist – your project report submitted using the correct form shown in Workbook 10. The form must be bound into your project.

Report Length - the maximum permitted report length is 15,000 words, which usually translates into around 50 to 100 pages (excluding appendices). If your report is likely to be significantly longer than this, consult your supervisor as to what to include and what to exclude. You are warned that should you exceed the permitted maximum length the University may return your work unmarked.

Binding - the project and any separate appendices should be securely bound using tape or book binding - if that is not available then plastic ring binding may be used. No other form of binding is permitted. Binding covers should be a card of weight of 140 gsm and the normal colour is to be RED but any other colour may used in case of sourcing difficulties

Front Covers Format - the front cover appropriately spaced vertically should conform to the pattern shown below using 24-point Arial Narrow with centred text and bold as shown. Do not include the square brackets when you complete these formats as they are just placeholders

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [Name of supervisor]

Project unit Code [Project unit code]
[Month and Year, e.g. September 2004]

Title Page - the first project contents page, appropriately space vertically must contain the following information in the order shown below using 12 point Arial Narrow/Time Roman type throughout. Do not include the square brackets when you complete these formats as they are just placeholders.

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [*Name of supervisor*]

Project unit: [*Project unit code*]

[Month and Year, e.g. September 2001]

Abstract - [The abstract of the project should be between 150 and 300 words in length and constructed to say what the project was about, what you did and what were the conclusions]

Keyword List - [List of appropriate key words]

Acknowledgements Page - it is common practice to add a page listing those you wish to thank for their help and assistance. As a rule acknowledgements should **only** be given to people who helped you directly with your work but were not involved in it. For example, if a colleague supplied you with a statistical analysis they should be acknowledged. However, it is not usual, necessary or desirable to acknowledge your parents, your friends or your supervisor.

Submission Form and Plagiarism Declaration

You must add the following two pages which require a signature. In practice one adds the signature to the final bound copies.

Declaration of presentation Standards

Include at this point a completed copy of the project submission page shown in workbook 10. Be warned, that if you tick this page and the relevant element is not found to be present, the work will be returned to you unmarked for correction.

Plagiarism Declaration

I confirm that the enclosed written work (including application code) is entirely my own except where explicitly stated otherwise. I declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

Signed _____ Date _____

Contents list, Table List and Diagram List

Include as appropriate

9.7 General Grade Criteria

Workbook 14 gives general guidance as to how projects will be assessed. Workbook 14 also contains a table of the criteria used, although the emphasis given to various aspects may vary depending upon the nature of the work and should be explained to students in assessment specific criteria.

9.8 Project Examination Board Reflections

This is a discussion based on observations made on the marking forms and in the Examination Board regarding the quality of the submitted document as final Master's projects/dissertations. Most of these faults are due to shallow and sometimes very shallow thinking on the part of the project student and that is unacceptable at Master's level. The following points are to help both supervisors and students avoid known pitfalls and so produce a project document to a high standard.

9.8.1 Project Introduction – Study Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem definition – common deficiencies were no discussion or poor discussion of what problem was being addressed by the project. Without such a discussion it is almost impossible for a reader to get any grasp of what the project is about. In projects we want to see just ONE major problem theme not several so it often requires clear thinking to set it at the right level. (See workbook 6 section 6.2 and 6.5)

Target and Outcome – there is often considerable confusion over these two ideas. The target is about what might happen in the real world based on the project outcome but often students cannot distinguish what the project will generate and what might be done with that project outcome. As a simple example, students might say that the project outcome is "improved accuracy in data entry" when what they mean one supposes is that in their project they will design (say) a new training programme that will be used to get the real work target of improved accuracy.

Speculation and Personal Theory – students are encouraged to speculate about problem causes and solution routes to arrive at a personal theory about the problem theme and how it might best be resolved leading to a suggestion of an expected form project outcome. A reader expects to see some indication as to what form the project outcome will take and in addition some discussion of the form to at least show that it is likely to go some way to resolving the stated problem theme. Unfortunately, the form was often missing and even when the Research Design was consulted a typical reader could still not see what the project outcome was supposed to be. Here we want to see ONE major form outcome for each project. (See workbook 6 section 6.5).

Research Question - either missing, badly worded or multiple questions offered (sometimes all in one sentence). One common mistake was to ask a question in the form (or some equivalent) of "is it possible...." - the point is that in such questions the answer is almost always that it is possible so the research effort becomes pointless. (See workbook 6 section 6.7 and 6.9)

Process for Generating Primary Data - this is a key element in any project as it is essentially the main activity used to unlock the primary data. It is useful to discuss this process briefly in the introduction since that allows readers to link the problem theme and therefore see what data you are likely to be looking for.

9.8.2 Project Introduction – Engineering Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem Theme - there was either no discussion or poor discussion of what problem theme the application being built was supposed to resolve. When this happens it is almost impossible for a reader to get any grasp of what the project is really about. (See workbook 6 section 6.2 and 6.5)

Functional Description - many students could not provide a short functional description of the application they were going to build. The most common thing for students to do instead was to provide an overview of the application architecture. This is hopeless as architecturally almost all Engineering projects are the same in that they typically have a database and a webpage for example. This implies that students cannot or do not want to make a distinction between how an application is built and what its purpose is.

9.8.3 Aim and Objectives

In many cases these elements were missing altogether. In other cases one could barely link the aim to the Research Question or application description. However, of most concern was an apparent inability in many students to write a coherent and reasonable set of objectives. Not to be able to write an aim and more particularly objective is representative of a gross error and it should never occur in Master's level work.

Aim - usually composed in a reasonable way but there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just one clear outcome for the aim. (See workbook 6 section 6.11, 6.11.1)

Number of Objectives - often there were far too many to be in any way practical for one student in the time available and often this was because they were all expressed at different levels of project resolution.

No Visible Outcome - there were many, many cases where the objectives had no visible outcome. Far too often we got phrases such as: "To understand...." or "To analyse...." without any object to the sentence so there was no outcome that was visible. Without a named outcome there is no way that the objectives can be seen to have been completed. (See workbook 6 section 6.11)

Not Project Bounded - there were many students who cited operational objectives as outcomes. For example it was common to see lines such as such things as "To improve the workflow in the invoicing section". Here is a case where such an outcome cannot be written into a document or be in practical terms viewed and so cannot be used in a project. Typically, unbounded objectives refer to something that might happen based on the project outcome after the actual project has been completed (See workbook 6 section 6.11)

Objectives as Requirements - very commonly but still rather worryingly, many students, on Engineering projects, seem to think that objectives are the same as application requirements. (See workbook 6 section 6.11)

Objectives as Benefits - less commonly but still rather worryingly, many students, on Engineering and study projects, seem to think that objectives are the same as benefits. For example, in a study project on CRM systems what one often finds in place of project objectives is a list of benefits of implementing CRM. Similarly, for Engineering projects we see objectives written as a set of benefits of using the application being built later on in the real world. (See workbook 6 section 6.11)

9.8.4 Literature Review

In research the literature review is regarded as being essentially preparation of the mind. It follows, that to be serious about this step one has to be evaluatory and reflective as you read and write. Ideally one needs a strong theme which is used to weave an expository and exploratory discourse that unites and builds one's understanding and ideas with what has been written by other authors on one's core topic area.

For projects a full literature review is only needed in the case of a study project. For Engineering all that is required is a thorough overview of the application area. So for example, if an application were about Insurance brokerage then all that is required is a description of what brokerage is but only to the level necessary to understand the requirements. With this aim in mind: (See workbook 5 but section 5.2 and 5.6 should be studied with care)

Structure - many reviews were poorly structured and one often felt that the students had just written down the material as it occurred to them without any thought as to a wider readership.

Theme - often there was no detectable theme connecting the various sections of the review narrative and a reader would therefore be forced to guess and see how all the various elements were connected.

Value Added - the most common flaw was to see a review that was entirely or almost entirely made up of quotations, paraphrases or summaries so that the 'hand' of the student was not detectable anywhere in the work. Such work is not evaluatory and gives no indication whatever that the student has learned anything of value or indeed anything at all. It is often the case that one feels the student has no notion of the literature being a driver that may mean they have to accept new knowledge, gain further experience, modify existing knowledge or even abandon what they thought was sacrosanct and sadly no belief that their own views and experiences are also important.

Citation Style - two things are evident here. Firstly, one finds that too often citations are limited to the Literature Review. Secondly, the actual style used is very poor and commonly we see the form (Burk, 1992 p45) placed at the end of a sentence or paragraph. This is not acceptable and can only mean the whole paragraph has been paraphrased. The ONLY correct use of this bracketed style is in a passing reference to a text. (See workbook 8)

Worthless Quotes/Paraphrases - it is unfortunately only too common to see an appeal to some text or other for information that tells you either common knowledge or makes an obvious observation and so the citation is worthless and is representative of weak scholarship and laziness where a student is just trying to add a citation because he knows that such things are desirable. For example, quoting an author who says that "Object Orientation is now routinely used in software construction" is representative of common knowledge or quoting an authors who "says change is inevitable in organisations" is something that one might regard as obvious.

9.8.5 Research Design

These were often far from satisfactory and often read like a joke delivered without the punch line. The students are taught that essentially there are two phases. The first phase is the process used to get primary data items that are formed into a collection. Once the collection phase is completed we move on to the second phase of processing where the collection of primary data is processed to get an answer in the form expected. Particular points are:

Research Phases - In many case students were unable to distinguish the processing needed to get a collection of primary data and processing of the collection of primary data to get an outcome. It is quite common to see these two phases ignored or become competed muddled leading to a poor research outcome because the student loses his/her focus and often appear to have no clear idea what they are doing. The phases are:

Phase 1 - a process or processes used to define and create a primary data collection. It typically has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the data and present the data.

Phase 2 - a process or processes used to manipulate the collection of primary data to get the form of answer expected.

No Outcome - often it seemed as if the student had no idea what form of outcome to expect so when one looked at the processing there was no sense that the primary data was being transformed into the required form of outcome.

Primary Data - many students seem to have only a vague notion of what primary data is and will often, very often, confuse or think that primary data is the same as the method of collection. This confusion is often evident with some students thinking that only questionnaire data could possibly be primary data.

Primary Data Definition - Primary Data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

For example, one student took the definition and then read through an accounting system manual for his company and extracted all the functions and claimed that was primary data because he was going to use it to define what an accounts package should have by way of functionality but seemed unable to see that the manual had effectively done that already. (See workbook 6 section 6.6)

Research Method Justification - often students could not distinguish between Research Method and Data Collection Protocols. Research Methods are frameworks such as Case Study, Experiment, Action Research and so on. Collection protocols are based on: interview, questionnaire, observation, role playing, seminars, focus groups and so on. The sorts of justifications used are of the form "I have chosen case study because Saunders (2005, p92) said case studies are good... This is hopeless and implies no real thought. Justification must be built from a sound understanding of a particular Research Question, its expected form of outcome and the Primary Data needs and at least an overview of which method is likely to be best in a given situation. (see Workbook 7)

Practicality - many plans were over-complicated with students trying to use multiple methods and then ending up with masses of data they had no idea what to do with. There is only limited time and so students should be encouraged to focus on just one Research Method although of course several protocols may be involved.

Data Collections - in many cases all an examiner was able to see were results but often one simply could not tell if any primary data collection was involved and the results just seemed to appear 'out of the air'. The marking guide is quite specific and projects must be clear about both processed data and raw primary data collections. Without this we cannot feel confident that students have done any actual research. Typically, the collection of primary data is placed in an appendix and might be in the form of a summary table of questionnaires results or summarised transcripts. Correspondingly, the processed primary data collection is expressed as charts, graphs, tables, reports and so on in the body of the project report.

Processing - this is one of the most disappointing elements. Processing is all about transforming your collection of primary data into the form of outcome expected. Far too often all we see is the processing of individual primary data items with no attempt or very weak attempts to really supply an answer to the Research Question in the form that was specified.

Location - there were quite a few projects where it was more or less impossible to see where the primary data came from and often this was accompanied by a very ordinary set of results that could have been written by almost anybody with a superficial knowledge of the subject area.

9.8.6 Research Results Processing

There were some very good examples but often this section was very routine and very disappointing.

Repeating - it was very common to see a chart for example, displayed and then underneath the student simply repeated the data that was in the chart in words. Such a practice is worthless. What any data related narrative is supposed to do is to tell the reader what the data means and what implication it might have - that is we expect to see some analysis and evaluation of the data in terms of the Research Question.

Focus - the focus of processing the primary data is to create a kind of transformation that generates from the collection of primary data the expected project outcome - unfortunately, this aspect was often absent. Typically in a survey for instance we have page after page of charts analysing individual data items but no attempt to sum it all up and reach a conclusion based around the Research Question.

9.8.7 Evaluation and Conclusions

These sections in a lot of student work are indistinguishable. The reason there are two sections with marks attached is because:

Evaluation - here one focuses specifically on the project outcome and research methods - that is we evaluate our product (outcome) and the methods used to generate it. Notice here this is NOT about generating the outcome that would have been done in the research processing section

Conclusions - here the attempt is made to say what it all means - that is trying to generalize the findings. So for example, suppose the outcome is about the use of Agent technology in eCommerce web sites then in conclusions one might try to say what a particular project outcome means for any eCommerce site or in fact any website. In a similar kind of way, if a particular application had been built we might try to say whether it might be applicable in other situations or whether some features of the design can be transferred to all applications of that type.

9.8.8 Ignorance of Project Marking Criteria

Many students show an almost complete disregard for the way a project is marked and so often automatically lose marks. Students must therefore carefully study the marking forms so that they know what components are regarded as essential to any project and therefore carry marks. (See workbook 11 or 12 as appropriate)

10. WORKBOOK 10 – FORM: PROJECT SUBMISSION

This form **must** be completed and included in your project submission. If you are unable to tick every box then your work is not ready for submission. If boxes are ticked and it is subsequently found that the relevant element is not present it will be taken as a deliberate attempt to falsify the record and regarded as a fail.

Project Word Count	Exclude appendices. If maximum is exceeded marks may be lost or the project rejected
	The report length is within the stated guidelines (15,000 words maximum excluding appendices)
	I have included all making elements indicated in workbook 11 Or 12 as appropriate and noted the marking guidance notes
	I have studied the guidance notes on common project faults found in section 9.6
	I have prepared two bound copies of all my project work including any separate appendices
	I understand that I may use one or both sides of the paper when printing the report.
	I have included a full contents list, table list and diagram list all numbered consistently
	I have used good quality A4 paper, normally in portrait orientation with a weight between of 80 and 100gsm.
	I have made sure that the pages are in the right order and none are missing
	I have used MS word .doc format
	I have formatted the front cover and title page as required and added the necessary plagiarism declaration.
	All my text is single line spaced at 6 lines per inch/25.4 mm.
	All my main text, including headings is in 12-point font (Arial Narrow is recommended)
	All my text in tables and diagrams is 10-point font (Arial Narrow is recommended)
	All main text is right and left justified
	No headings at whatever level are indented
	Headings are NOT followed by a blank line
	Headings are in the same font and size as the main text but are shown in bold type
	No numbered headings are orphaned (that is all heading must be followed by some text not immediately by another heading)
	I have used a single blank line to separate paragraphs
	All chapters and appendices are numbered sequentially (1, 2, 3,...)
	All subsections are numbered (2.1, 2.2,...) and none of my sections numbers exceed three levels (1.2.1, 1.2.3 ...)
	All my margins: (top, bottom, left and right) are 20mm
	Pages have centred footers in 10-pt Arial Narrow: Page 12 of 97 - J.J. Letto HEMIS No. 567543 Submission Date: 2004/05
	I have cited other people's work properly using the Harvard APA format
	I have included all citations in my list of references
	My abstract accurately summarises all of the report, not just parts of it
	All my chapters and appendices start on a new page
	I have included appendices, where appropriate, covering: project specification, Project Plan, Requirements document(s), design document, screen shots, source code, user documentation, test results, evaluation results, questionnaires, etc.
	My supervisor has read each chapter as the work progressed.
	My supervisor has read the whole report
	I understand that indented sentences can be used where appropriate but bullets are not recommended (see 9.3.1)
	I understand that page headers are not required
	I understand that each of my chapters should start with an introductory section that explains what the chapter is about
	I understand that each of my chapters should end with a summary and a helpful link to the next chapter
	I have fixed a copy in .doc format of the project document and any appendices on floppy/CD/DVD to my project submission
	All my primary data (including requirement data) is original to this study and collected by me for this specific project purpose
	Engineering Projects only - I have included an executable file of my application on an attached floppy/CD/DVD
	Engineering Projects only - Application Operating instruction are on the attached floppy/CD/DVD as well as in the appendix
	Engineering Projects only – In my application I have not used illegal copies of any software or included any software where there is an expiry date which may render the application inoperable in the future.
	Engineering Projects only - I understand that the copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If, and only if, this is not possible then I have included in my project a supervisor signed set of screen shots in the appendix confirming that he/she has viewed the application in action.
Signature of Student.	Date.

11. WORKBOOK 11 – FORM: STUDY PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

STUDY STYLE		Postgraduate Project Marking Form						STUDY STYLE	
Name of Student							HEMIS No.		
Brief Project Title							Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion						Re-Work	New Topic	
Name: Supervisor									
Name: Marker									
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker		
Project Unit	PJ.NCC								
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected						
External Examiner	N	Y	Refer to the External Examiner (if "Y" add comment in section G)						
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit						
References: See Workbook 11 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes									
Section A - Marks for Planning and Preparation							Weight	Mark	
1.	Project specification, including project plan						5		
2.	Review of the topic area literature						15		
Sub-Total							20		
Section B - Marks for Project Introduction									
3.	Presenting problem and its exploration including the Research Question						5		
4.	Discussion of the project's scope, scale, aim and objectives						10		
Sub-Total							15		
Section C - Marks for Project Primary Data Research and Outcome Generation									
5.	Selection and justification of Research Method						5		
6.	Primary data collection plan including data specification						10		
7.	Primary data processing plan to get expected outcome						10		
8.	Presentation and discussion of the collection of Primary Data						10		
9.	Description and discussion of main project outcome						10		
Sub-Total							45		
Section D - Marks for Project Evaluation and Conclusions									
10.	Evaluation of the project outcome (Project Specific)						5		
11.	Evaluation of project practice (Project Specific)						5		
12.	Statement of conclusions and reflections (Project Generalisations)						10		
Sub-Total							20		
Section E – Qualitative Assessment matrix based on University Grade Criteria									
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words			
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless			
3.	Report structure	very poor	poor	satisfactory	good	excellent			
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report			
5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours			
6.	Project idea	trivial	easy	modest	challenging	Difficult			

7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Primary data collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Data processing	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
14.	Main project outcome	Worthless	obvious	useful	original	exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Study Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes found in Workbook 14.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.2 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the topic area literature

Reference: Workbook 5 section 5.2 and 5.6 in particular, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers and generally be focused on the central project topic. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and its exploration including the Research Question

Reference: Workbook 3 section 3.3 and 3.5.1, Workbook 6 sections 6.2, 6.6 and 6.7 and Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Research Question with a defined form of answer (project outcome). It is very common to see an expression of a problem as "my problem is to find a solution to..." or expressed in such a way that it is in effect a solution and such expressions are indicative of students who do not know what the problem is but nevertheless know what the solution is. Similarly, students who list multiple problems, have no Research Question (or a very poor one) and do not discuss the form of outcome expected are embarking upon projects where there is no clear focus and these typically fragment when it comes to the core research and one most often cannot find any clear project outcome later in the work. It is also useful at this stage if there is some indication of the Basic Activity for Generating Data (BAGeD) so that one can feel sure that the student is aware of what primary data they need in order to generate the intended outcome.

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.2 (example), Workbook 6 section 6.1 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition, expected form of outcome and Research Question all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Selection and justification of Research Method

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful choice of Research Method focused on resolving the stated problem theme. In practice this implies a consideration of primary data needs, location of primary data and the collection protocols that might be used. Markers should guard against rationales that amount to saying that some text book or other said method X or Y was good for certain kinds of scenario – that is copies of generalisations about Research Methods found in books do not amount to a rational for a specific research situation. Furthermore, markers need to feel confident that the student understands the distinction between a Research Method and the collection protocols used within them.

6. Primary data collection plan including data specification

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

This is a crucial stage in a research based project and markers must be confident that the plan is practical. A marker must look for a clear core activity represented by a statement about of BAGeD and that core activity should be surrounded by whatever other processes are needed to ensure reliable collection of the primary data. The whole primary data collection plan has four steps which must be visible in the project document: data definition, data location, data collection and how the whole collection of primary data is to be presented. Markers should also take care that the formation of a collection of primary data is not confused with the processing of it to get the stated project outcome.

7. Primary data processing plan and presentation of the expected outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for clear evidence that the student has taken the collection of primary data they obtained earlier in the project and now process that whole collection to get to a clear presentation of the project outcome. It is therefore important that markers can see what processes were applied to the collection of primary data to get the outcome – without this process visibility there is no evidence as to how the project outcome was actually obtained. Markers should be wary of processing plans that say such things as “I will look at the data” or “I will analyze the data” or “I will use SPSS” as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same data collection they could apply the same processes and get the same or at least a very similar outcome.
Markers should also be aware that very often students will often process individual data items – such as might be found on a questionnaire, but never get to a point where the stated project outcome is derived from the collection of data.
8. Presentation and discussion of the collection of Primary Data
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for visible signs of the collected primary data. The primary data collection is most often presented in tabular form in the appendix and might be displayed as graphs, charts, tables or diagrams in the main project document.
9. Expression and description of main project outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
The intended project outcome must be clearly visible – for example if the intended outcome is a model then that must be clearly shown in some acceptable form and be based on the processing plan outline in section 7. Markers must therefore take great care that the presentation of primary data and the processing of individual data items in the collection are not offered as a substitute for the student generating the intended project outcome.
Section D - Marks for Project Evaluation and Conclusions
10. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project outcome so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution (project outcome) or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project outcome. The section is not intended for vague thoughts about the topic but a considered evaluation of the project outcome when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
11. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate here. This section is important as this is where one expects to find some information on what the student has learned about the way they work and the tools they used. It is unfortunately often the case that students have very little idea about what they did apart from stating vague activities such as “look at”, “analyze” or “use SPSS” so without anything concrete to evaluate they resort to the routine and say “the survey process went very well” or “my case studies generated useful data” or else they simply ignore this form of evaluation altogether. Evaluation of project practice is difficult and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking ‘how did I do it’, ‘was it successful’ and ‘could I or should I on reflection have done it another way’. Additionally, one needs to be aware of any constraints involved, including time management and particular skills that might have impacted on the use of best possible practices.
12. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a project outcome was based on case studies and the outcome was a review of IT outsourcing in Hong Kong then here we might expect to see the student consider the outcome he obtained which refers to Hong Kong and then consider and discuss whether that outcome has wide applicability, for example, to China, South East Asia or even the world as part of a Global economy or is it just specific to that local situation. Essentially, one is asking what do the outcome ‘mean’ when set in a wider setting. It follows that the focus of awarding marks here is for project generalisations.
It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such as future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

12. WORKBOOK 12 – FORM: ENGINEERING PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

ENGINEERING STYLE		Postgraduate Project Marking Form				ENGINEERING STYLE	
Name of Student						HEMIS No.	
Brief Project Title						Total Mark	%
Recommendation	If the mark awarded is a fail circle your opinion					Re-Work	New Topic
Name: Supervisor							
Name: Marker							
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker
Project Unit	PJ.PEA						
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected				
External Examiner	N	Y	Refer project to the External Examiner (if "Y" complete section G)				
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit				
References: See Workbook 12 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes							
Section A - Marks for Planning and Preparation						Weight	Mark
1.	Project specification, including project plan					5	
2.	Review of the application/product area and its client/business setting					10	
Sub-Total						15	
Section B - Marks for Project Introduction							
3.	Presenting problem and outline proposal					5	
4.	Discussion of the project scope, scale, constraints, aim and objectives					10	
Sub-Total						15	
Section C - Marks for Project Primary Data Research and Outcome Generation							
5.	Detailed requirements collection plan based on proposal					5	
6.	Analysis of requirements: functional, performance, technical and usability					5	
7.	Presentation, analysis and discussion of the design					10	
8.	Discussion of build process and design implementation					10	
9.	Application testing process and results					5	
10.	Implementation plans					5	
11.	Attributes of the project artefact (e.g. quality, reliability, etc)					10	
Sub-Total						50	
Section D - Marks for Project Evaluation and Conclusions							
12.	Evaluation of project product against requirements (project Specific)					5	
13.	Evaluation of project practice (project specific)					5	
14.	Statement of conclusions and reflections (project generalisations)					10	
Sub-Total						20	
Section E – Qualitative Assessment matrix based on University Grade Criteria							
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words	
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless	
3.	Report structure	very poor	poor	satisfactory	good	Excellent	
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report	

5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours
6.	Project idea	trivial	easy	modest	challenging	difficult
7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Requirements Collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Design Expression	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
15.	Artefact Evaluation	worthless	obvious	useful	original	Exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Engineering Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.1 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the application/product area and its client/business setting

Reference: Workbook 5 section 5.2 and 5.6, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers. In Engineering projects the expectation is that the review will focus on the application area and be in enough detail to at least understand and gather the requirements. It is permitted to include technical material if they have a special or unusual significance to the application area but in so doing students must be aware that the routine inclusion of what at this level might be regarded as common knowledge in computing/IT will not attract any marks. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and Outline Proposal

Reference: Workbook 3 section 3.3 and 3.5.1 Workbook 6.2 and 6.5, Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Application Outline expressed as a functional description. It is very common to see an expression of a problem as "my problem is to find a solution to..." and this is indicative of students who do not know what the problem is but nevertheless know what the solution is. Students who list multiple problems, have no functional description (or a very poor one) are indicative of projects where there is no clear focus and these typically fragment when it comes to requirements gathering and often end in a very trivial application. Markers should be aware that students may avoid giving a functional description and instead offer a generic architectural one and this must be penalised as the student clearly does not know what function the application supplies

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.1 (example), Workbook 6 section 6.11, 6.9 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition and Application Outline all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Detailed requirements collection plan based on proposal

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful consideration of the Requirement Gathering process focused on obtaining sufficient information to build the intended application and resolve the stated problem theme. In practice this implies a consideration of application functions, location of requirements data and the collection protocols that might be used. Normally in research one would expect a rationale for the choice of Research Method but for Engineering projects it is taken for granted that the method is requirements gathering. Instead one should look for a clear focus on constructing a feasible and comprehensive requirements document based on the application outline. Furthermore, markers need to feel confident that the student understands the distinction between Requirement Gathering as a Research Method and the collection protocols used within it.

6. Analysis of requirements: functional, performance, technical and usability

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers must look for a clear Application Proposal and a requirements catalogue. Here one needs to see a discussion of the requirements to ensure they are credible (realistic), comprehensive, complete and stakeholders have been considered. One might also usefully consider the approach that was taken to gain them and whether they are of the form of strategic, tactical or operational.

7. Presentation, analysis and discussion of the design
Reference: Workbook 9 sections 9.6.5 and 9.6.6 and Workbook 7 section 7.9
Marks are awarded here for clear evidence that the student has taken the requirements obtained earlier in the project and processed them to get a suitable design. Therefore, markers must be able to see a clear link from requirements to design and where necessary observe how the requirements were processed. Markers should be wary of processing plans that say such things as "I will look at the requirements" or "I will analyze the requirements" as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same requirements they could apply the same processes and get the same or at least a very similar outcome.
8. Discussion of build process and design implementation
Reference: Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for a rational discussion as to what architecture, components, languages and tools and so on are needed to best implement the design. This discussion may also imply the various situation constraints have to be considered as well.
9. Application testing process and results
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers must look for evidences of a testing plan and a consideration of test results. Typically the plan and results are placed in the main project document in outline form with the details in an appendix. Often students will just discuss white or black box testing or regression testing or something similar but without any actual test plans or results – in such cases marks should not be awarded as these materials is considered common knowledge at this level – however brief references to it are permitted.
10. Implementation plans
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a comprehensive implementation plan – it need not be extensive or in minute detail but it should cover installation, user training, data conversion/loading, change over, user acceptance and hand-over.
11. Attributes of the project artefact (e.g. quality, reliability, etc)
Reference: none
The intended project application must be clearly visible and available to run directly from a disc or DVD. Markers are to award marks based on their perception of the general quality of the application if they were to put themselves in the place of a user. Assessment may then consider colour scheme, ease of use, operating instructions, presentation (does it look as if its finished), speed, etc.
Section D - Marks for Project Evaluation and Conclusions
12. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project application so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project application. The section is not intended for vague thoughts about the situation or application but a considered evaluation of the project application when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
13. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate. This is where one expects to find some information on what the student has learned, the way they work and the tools they used. It is often the case that students have very little idea what they did apart from being able to state vague activities such "look at" or "analyze" so without anything concrete to evaluate they resort to the routine and say "the survey process went very well" or "the UML modelling was straightforward" or else they simply ignore this form of evaluation. Evaluation of project practice is difficult because the student must ask searching questions related to process success and the notion of good and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way' or "what were my constraints".
14. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a an application was for eCommerce selling shoes it might be possible to ask what aspect of that application could be re-used to sell other product. It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

13. WORKBOOK 13 – FORM: PROJECT MARKING RECONCILIATION

The form shown below is included for reference only so that you can see how your project will be marked.

Project Mark Reconciliation Form		Final Agreed Mark (%)	
Name of Student			
Brief Project Title			
Name: Supervisor			
Name: Second Marker			
Name: 3rd Marker			
<p>Cause – in this box, describe, for each applicable section, why the marking disagreement occurred.</p> <p>Rationale – in this box, If a mark can be agreed, explain the rationale used to reach agreement. Please note that it is only necessary to agree the total mark for each section not individual category marks.</p> <p>Irreconcilable - If you cannot agree a mark leave rationale blank and it will be filled in by a third marker who will place a tick in the small square box.</p>			
Section A - Marks for Planning and Preparation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section B - Marks for Project Introduction		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section C - Marks for Project Primary Research and Outcome Generation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section D - Marks for Project Evaluation and Conclusions		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			

14. WORKBOOK 14 – SUPERVISION AND MARKING GENERAL GUIDANCE NOTES

1. **Presented Work** - Marker's are reminded that any marks awarded must be solely based on the assessment of work presented within the mark categories listed on the mark forms. It is not permitted to award marks for "hard worker" or "tried very hard" or "was a good student" or any similar observation as there are no relevant mark categories and this kind of criteria is almost impossible to evidence.

When an Engineering artefact is presented it should be viewed in action to ascertain the mark for "Attributes of the Project Artefact". The copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If this is not the case then markers must assume that there is no evidence for the application and set the mark accordingly.

2. **Word Count** – on the project submission form there is a space for a word count (excluding appendices) and if this is exceeded then it is indicative of a deliberate attempt to go beyond recommendations and you may therefore find that it leads to laboured descriptions or inclusion of irrelevant material in the project document and you should therefore mark accordingly.
3. **Structure** – mark categories do not necessarily represent chapters in a project document and so Marker's need to be aware that a particular project may be structured in a way that does not correspond to the sequence presented on the mark forms (though it is recommended to do this when possible). However, all the elements on the marking form must be visible in the work presented.

Although it is recommended that the mark form sequences be followed in the project document that does not mean that there has to be a chapter for each mark category. Students, therefore, should be encouraged to merge sections in order to produce a concise document. For example, it is perfectly possible and reasonable to merge the two evaluation sections and conclusions into one chapter as long as the relevant mark elements are still visible.

4. **Appropriateness** - any work presented must be within the prescribed subject area for the course. If a marker suspects that this is not the case then they should consult with the relevant course leader for clarification. In such accepted cases markers must regard the primary data and its processing as not being appropriate and mark with that in mind.
5. **Evidence** - the project report or appendix must contain sufficient evidence that the core project research work has been done (not the literature review). That is, in the case of study project a marker must be able to see the primary data collection appropriately presented (usually in an appendix). In the case of Engineering projects it must be possible to see a suitable requirement document or catalogue (possibly in the appendix). Once the primary data is visible then it must also be possible to see how that data was transformed into the intended project outcome.
6. **Literature Support** - when marking Literature Reviews their content must be seen to be focused on the topic area and address clearly the associated problem theme without any irrelevant material with the intention of offering a concise discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (see section 5.1)
7. **Grade tables** - markers must be aware of the criteria associated with awarding a given overall mark as they may be required to justify it to the UAB in terms of the criteria stated in the table shown below.
8. **Process** – when marking it is important that the process used to get an outcome by the student is visible in the project document. In practice this means that it is possible to perform the following trace: presenting problem, discussion of how problem might be resolved, suggested form of project outcome, research design and execution, generation of stated outcome, evaluation and conclusions – viz:

Engineering – typically, the process starts with a business related or technical problem theme leading to a research plan for the collection and discussion of requirements and their transformation into a suitable design and associated architecture. From this there should follow a build, implement and testing process with the whole project completed with suitable project specific evaluations and conclusions containing generalisations.

Study – typically, the process starts with a business or strategic IT related problem theme leading to a research plan for the collection and discussion of primary data and its transformation into an outcome that would resolve or go some way to resolving the stated problem theme. The whole

project is then completed with suitable project specific evaluations and conclusions containing generalisations.

Marks	Master's Level Grade Criteria
70 – 100	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Excellent work - able to express an original reasoned argument in a lucid manner by reviewing & critiquing a wide range of material. Original, critical thinking based on outstanding insight, knowledge & understanding of material. Material contributes to current understanding & is of potentially publishable quality in terms of presentation and content ▪ Wide reaching research showing breadth & depth of sources
60 – 69	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Clear, balanced coherent critical & rigorous analysis of the subject matter. Detailed understanding of knowledge & theory expressed with clarity ▪ Extensive use of relevant & current literature to view topic in perspective, analyse context & develop new explanations and theories
50 – 59	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Detailed review and grasp of pertinent issues & a critical contextual overview of the literature. Thorough knowledge of theory and methods & uses this to underpin arguments and conclusions ▪ Confidence in understanding and using literature
40 – 49	<ul style="list-style-type: none"> ▪ Demonstrates grasp of key concepts & an ability to develop & support an argument in a predominately descriptive way with valid conclusions draw from the research ▪ Familiarity with key literature which is cited and presented according to convention ▪ Logical & clear structure, well-organised with good use of language and supporting material
0 – 39	<p>FAIL – Some knowledge of relevant concepts & literature but significant gaps in understanding and/or knowledge. Little attempt at evaluation, conclusions vague, ambiguous & not based on researched material. Limited or inappropriate research. Deficits in length, structure, presentation &/or prose.</p>

This form may be used by you to feedback to the University your experiences in the courses. It is normally sent to your tutor at the end of the course.

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Researching: Some different methods and approaches

Dr Carl Adams

For Research Methods Residential School, 13th
September 2006
School of Computing



Aim

- To develop understanding of research issues for different research methods



Agenda

Three research projects using different methods:

- 1) Survey – mobile use questionnaire
- 2) (building on) Mixed methods, Interviews, observations – Confirmation case study
- 3) Secondary data analysis – Biases in development techniques

Main issues, questions (+questions throughout!) ...



Survey – mobile use questionnaire

- Background
- Research questions
- Research method
- Survey ... what type, who to survey, how many, how to process the data / interpret the results ...?
- Research process
- Challenges



The problems/ question?

How attached were people to their mobiles?

- Examines the existing relationship people have with their mobile phones
- Likely impact on developing trust in the 'mobile' relationship



The research study

- Questionnaires, paper based
- Distributed to students at Universities in three different countries (France, UK and China) ... mainly UoP
- Now over 1500 responses
- Target students (as an interesting user group) ... but big issues!



Mobile Use Questionnaire

- Double-sided A4 sheet
- Mostly 'tick boxes'
- Anonymous responses (but age, gender, nationality details)
- Questions to examine attitudes and attachment to mobile phones
 - 'support mechanism'
- Questions about watches (provided a comparison)



*If you left home and two minutes later realised you have left your **mobile** phone at home, would you go back for it if you were:*

	Yes	Probably	Probably not	No	Don't know
Going on a long journey?					
Just going down the shops?					
Going to work, college or school?					
Going to work, college or school and were already 5 minutes late?					



- How robust is this?



Confirmation case study:

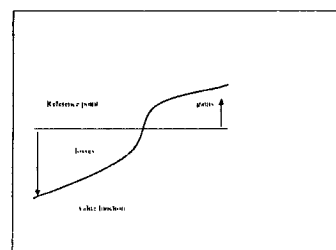
- Background (building on previous mixed methods, Interviews, observations)
- Research questions
- Research method
- Case study ... what type, who to choose, how long and what data to collect (and how), how to process the data / interpret the results ...?
- Research process



Choice of theoretical framework:

Prospect theory (Kahneman and Tversky 1979)

- 'tried and tested'
 - several examples
 - guidance on conducting robust, repeatable research
- not applied to the information systems field before
 - scope for novelty/adding to knowledge



Prospect Theory's value function, from Kahneman and Tversky (1979)



Previous research activity (and theoretical framework) provided guidance on ...

- What to look for (observations)
- What to ask (interviews)
- What type of case study (a 'good' example)

- How robust is this?

Secondary data analysis – Biases in development techniques

- Background
- Research questions
- Research method
- Secondary data ... what type, what to include / not include, how many, how to process the data / interpret the results ... ?
- Research process
- Challenges

The problem ...

Techniques (lots of them ...)

- | | |
|---------------------------|---------------------------------------|
| • Rich pictures | • Entity life cycle |
| • Root definitions | • Object orientation |
| • Conceptual models | • UML |
| • Cognitive mapping | • Case-based reasoning |
| • Entity modelling | • Risk analysis |
| • Relational modelling | • PERT Charts |
| • Normalization | • Gantt charts |
| • Dataflow diagramming | • Lateral thinking |
| • Decision trees | • Critical success factors |
| • Decision tables | • Scenario planning |
| • Structured English | • Future analysis |
| • Structure diagrams | • SWOT |
| • Structured walkthroughs | • People techniques |
| • Matrices | • Stakeholder analysis |
| • Action diagrams | • Joint application development (JAD) |
| | • ... |

Techniques have evolved ...

- Many new techniques
- Some based on the earlier 'traditional' techniques
- 'good practices' evolving to address the 'current' development environment
- Plus some re-badging

Techniques seen as neutral...

- Techniques are generally seen as providing neutral support for developers
- We challenge this view ...
(based on strong evidence from the Psychology lit.)
- Earlier work ...
 - classification based on visual/language and paradigm/process influences
 - technique are likely to influence problem cognition

E.g. Conceptual blocks ...

- Perceptual Blocks**
- Cultural and Environmental Blocks**
- Emotional Blocks**
- Intellectual and Expressive Blocks**
(conceptual blocks, adapted from Adams 1987)
- ... provided a starting point

Group	Perceptual Blocks	Emotional Blocks	Cultural and Environmental Blocks	Intellectual and Expressive Blocks	Visual representational attributes	Language and discourse attributes	Individual attributes
Brainstorming	Low	Low-Medium *	Low	Low-Medium High *	Low-Medium	Low-Medium **	Low-Medium High **
Relationship	High	High-Medium *	High	Low-Medium High *	High	Medium-High	Low-Medium High **
Scenario	Low-Medium	Medium *	Medium	Low-Medium High *	Medium	Medium	Low-Medium High **
Storyboard	High	High (lack of task flexibility) *	A High	Low-Medium High *	High	High	Low-Medium High **
Matrix	High	High-Medium *	High	Low-Medium High *	High	Medium	Low-Medium High **
Conflict	Low-Medium	Medium *	Medium	Low-Medium High *	Medium	Medium-High	Low-Medium High **

Application ...

- Applied to around 70 techniques
 - (appendix in paper)
- suggested use techniques from different categories
 - reduce risk of cognitive/ conceptual biases due to framing and scooping influences.
- likely to be further influences,
 - individual biases towards different techniques (or tasks within them), negative versus positive framing and a range of perceptual blocks.

- How robust is this?

Main issues?

- Research process
- Research questions?
 - Best research method to address question &
 - Best type of data to address question
- or
- Realistic research method to address question
 - Realistic type of data to address question

Main issues?

- Data collection ... think about how you are going to analyse the data before you collect it
- Data analysis ... interpreting the results
- Plus lots of other issues ...

Main issues?

Good research (publishable, good marks etc), should have:-

- Good (robust, realistic) methods, data collection, and analysis
- Originality, contribution
- AND Good foundations ...research questions, supporting literature, theory

Thanks for your time,

Any (more) questions?

Refs for research

- 1) A few ...
 - a) Adams C. (2006) Social inclusion and the shifting role of technology: age the new gender in mobile access? IFIP WG8.2 conference, Theme: Social Inclusion: Societal & Organizational Implications for Information Systems', 12-15th July 2006, Limerick, IE.
 - b) Adams C, Millard P and Avison D.E. (2003) *Personal trust space in mobile commerce*. 6th International Conference on Electronic Commerce Research (ICECR-6), INFORMAT, Dallas, October 23-26.
- 2) A few ...
 - a) Adams C and Avison DE (2004) *Reflection on development techniques using the psychology literature: Over two decades of bias and conceptual blocks*. IFIP WG 8.2 Conference: Relevant Theory and Informed Practice - looking forward from a 20 year perspective on IS research, Manchester, England, 15 - 17th July 2004. In proceedings, pp 493-514, ISBN 1402080948.
 - b) Adams C. (2005) Supporting structures for evolving systems development. *International Journal of Information Technology and Management (IJITM)*, special issue: Adaptive Evolutionary Information, Knowledge, and Management Systems, Vol. 4, No 4, 2005, pp423-442.
- 3) Adams C and Avison D (2003) Dangers inherent in the use of techniques: identifying framing influences. *Information Technology and People*, Vol.16, No. 2, pp203-234.

Committee Structures and Responsibilities

The University has a committee structure that manages all aspects of courses. This includes day to day running of the course, assessment, award of credits and award of final degree. Outlined below are the committees relevant to this course and details of what their purposes are.

Board of Studies (BOS)

This Board has direct responsibility for the academic validity, coherence and quality of the course. Membership consists of course leaders, the head of department, facilitators, service providers, students and student representatives (designated from each cohort). They are held at least twice per annum using a synchronous chat room.

Students and staff place items on the agenda via the discussion boards, and can attach documents if required. All students and academic staff are permitted to attend the online BOS and may contribute if they wish.

Unit (Module) Assessment Board (UAB)

This Board meets at least four times per year, but may exceptionally meet at other times in order that information to students on the results of assessment are not delayed. The Unit Assessment Board confirms the marks for each module and awards the credit points.

Board of Examiners (BOE)

This Board will consider all student results profiles and has the power to make appropriate awards to students who successfully complete their studies. The Board meets at least four times per year but may exceptionally meet at other times in order that information to students on the results of assessment is not delayed. Details on recommendations made in this meeting can be found in the Academic Regulations.

Quality Assessment and Feedback

We are always ready to make improvements to the structure, processes, assessment, resources and learning on the courses. In order to do so, a number of review mechanisms are used:

Module Review - on completion of a Module, teaching staff will normally review the Module with a view to possible improvements in materials, content and presentation. The review may be carried out in a number of ways but typically by means of an online feedback form.

Course Review - the Account Manager will normally carry this out at the end of your course. In most cases an online feedback form will be used. In general the review will cover four areas (programme of study, general topics, resources, teaching and learning.)

Account Manager - will review the discussion boards on a daily basis and will attempt to answer your questions, resolve difficulties or deal with complaints as soon as possible. If you wish your communication to be private you may use email services.

Board of Studies - will have a section on its agenda devoted to student matters and consideration of feedback.

Assessment

Both modules studied on this programme are assessed by coursework 100%. The assessment for the **Research Methods** module is in three parts as follows:

Assessment Part 1: Written Preparation for the project (70%)

Assessment Part 2: Statistics Questions (30%)

Assessment Part 3: Project Specification (approved/not approved)

In **Part 1** students will formulate a research question and perform a detailed analysis of the topic chosen, write a literature review, and outline a research method.

In **Part 2** students will answer a series of statistics questions.

In **Part 3** students will write an outline of the project they wish to undertake.

The **Project** module is assessed by a single piece of work in which the subject chosen is discussed comprehensibly and at length. The subject will be supported by a literature review.

To find out detailed information refer to the Module Specification (link on homepage) and within the actual online course material for that module.

External Examiners

Every award-bearing course in the University has an external examiner who is tasked to independently review the assessment procedures and standards. In order to carry out their function they examine a selection of marked continuous assessment work and sit on the Board of Examiners. All cases of failure are reviewed by them and their comments are always sought when recommendations for either deferral or referral are made. In addition, external examiners are non-executive members of the course team and their views on all significant course related matters will be sought.

Plagiarism or Other Malpractice

The term plagiarism is used to describe 'literary theft', of either ideas, or of the actual words, formulae, etc. of another person or persons. It is one of the worst things that one can be accused of in academic life as it is really a form of stealing or cheating.

It is normally expected that students will carry out research prior to completing an assessment. It is therefore permissible to use textbooks, lesson notes and to include (with appropriate citations) elements of published work and so on to support and prepare your own work. However, it is not permitted for you to use published or unpublished material as a substitute for your own work without acknowledgement. Published material includes texts you find in the library, lesson content, Internet web pages, documents belonging to your employer; indeed anything that can be defined as belonging to an author other than oneself.

Plagiarism, therefore, is defined as the attempt by a person to present the work of others as if it was their own. Such illicit presentation includes paraphrasing another author's work and copying from textbooks or journals without using quotation marks and citing the source.

Copying of notes or the work of other students is also considered as plagiarism even though the work being copied from is not published in the ordinary sense of the word.

There are two common forms of plagiarism, the most obvious one being where someone submits all, or part, of someone else's assignment as his or her own work. The second, and probably more common form is where an assignment contains unattributed ideas or passages from books, articles or lecture handouts. Sometimes this is deliberate, but often it is because the student is unaware of how they should use and reference source material in their work.

Penalties for Plagiarism

Plagiarism in written assignments is treated as a serious offence by the University in much the same way as cheating in an examination, and there are a range of regulations that address this issue. Where students are found to be guilty of plagiarism a range of penalties are available that range from a reduction in the mark awarded to the cancellation of the entire assessment. In all cases the matter is reported to the Board of Examiners. Persistent offences could lead to more serious disciplinary proceedings being instituted.

Outline procedure for suspected plagiarism

When a member of staff suspects a student of plagiarism the matter is brought to the attention of the course leader and the assignment is second-marked. If the second-marker also believes some, or all, of the work to be plagiarised then the student will be contacted by the Head of Department with details of the alleged offence, probably by email. The student has an opportunity to answer and refute the allegations. If the Head of Department believes that the offence is proved to have occurred sanctions may be applied. If the student feels that the allegation of plagiarism is unfounded then they have the right of appeal before a formal disciplinary panel.

Details of the full procedures relating to plagiarism, and for all forms of assessment malpractice, are to be found in the Handbook of Academic Regulations.

Grade Criteria (Level M)

General Criteria applicable to essays, reports and aspects of projects and dissertations

	Level M
80+	As below plus: Excellent work - able to express an original reasoned argument in a lucid manner by reviewing & critiquing a wide range of material. Original, critical thinking based on outstanding insight, knowledge & understanding of material. Material contributes to current understanding & is of potentially publishable quality in terms of presentation and content Wide reaching research showing breadth & depth of sources
70-79	
60-69	As below plus: Clear, balanced coherent critical & rigorous analysis of the subject matter. Detailed understanding of knowledge & theory expressed with clarity Extensive use of relevant & current literature to view topic in perspective, analyse context & develop new explanations and theories
50-59	As below plus: Detailed review and grasp of pertinent issues & a critical contextual overview of the literature. Thorough knowledge of theory and methods & uses this to underpin arguments and conclusions Confidence in understanding and using literature
40-49	Demonstrates grasp of key concepts & an ability to develop & support an argument in a predominately descriptive way with valid conclusions draw from the research Familiarity with key literature which is cited and presented according to convention Logical & clear structure, well organised with good use of language and supporting material
30-39	FAIL Some knowledge of relevant concepts & literature but significant gaps in understanding and/or knowledge. Little attempt at evaluation, conclusions vague, ambiguous & not based on researched material. Limited or inappropriate research. Deficits in length, structure, presentation &/or prose

Project Grade Criteria

The characteristics of different classes of project are given below. They have been adapted and extended from the assessment criteria for the Partnership Degree scheme and from those used at other universities. They show the characteristics typically shown by projects of a given standard. Where a report shows a mix of characteristics from two adjacent grades (e.g. 75% and 65%) then it is appropriate to award a borderline mark (i.e. 70%).

Grade	Typical characteristics
95% (outstanding)	<ul style="list-style-type: none"> ▪ Outstandingly thorough understanding of all concepts and of the distinguishing features and trends within the field of study. ▪ Shows exceptional understanding of the issues relating to the project. ▪ Clear structure (introduction, sections, conclusions) with critical analysis and evaluation. So readable it couldn't be put down. ▪ Good flow and very clear writing style. ▪ Excellent use of presentation techniques (diagrams, tables, pictures, etc.). ▪ Relates to wider issues in field of study. ▪ Publishable in a major conference or journal.
85% (excellent)	<ul style="list-style-type: none"> ▪ Very thorough understanding of key concepts and of the distinguishing features and trends within the field of study. ▪ Overview of the field used as a basis for independent judgement. ▪ Clearly states objectives, and the whole report relates to achieving those. ▪ Clear structure (introduction, sections, conclusions) with critical analysis and evaluation. Stimulates interest in the reader. ▪ Good flow and clear writing style. ▪ Excellent use of presentation techniques (diagrams, tables, pictures, etc.). ▪ Relates to wider issues in field of study. ▪ Publishable in a minor conference or journal.
75% (first class)	<ul style="list-style-type: none"> ▪ Thorough understanding of key concepts and of the distinguishing features and trends within the field of study. ▪ Overview of the field used as a basis for independent judgement. ▪ Clearly relates to title and stated aims. Omits the irrelevant. ▪ The objectives are distinctly ambitious but are rarely defeated. A clever solution is found. ▪ Clear structure (introduction, sections, conclusions) with critical analysis and evaluation. Stimulates interest in the reader. ▪ Good flow and clear writing style. ▪ Excellent use of presentation techniques (diagrams, tables, pictures, etc.). ▪ Relates to wider issues in field of study. ▪ Any artefact is of excellent quality.
65% (upper second class)	<ul style="list-style-type: none"> ▪ Good understanding of some but not necessarily all features of the field. ▪ Fluent use of concepts. ▪ Sound structure and good flow. Maintains interest. ▪ Addresses the topic. ▪ Links to wider issues in the field of study. ▪ Evidence of background reading and knowledge. ▪ Some critical evaluation. ▪ Any artefact is free of significant defects.

55% (lower second class)	<ul style="list-style-type: none"> ▪ Evidence of some understanding of the field or explanation of some issues in the field. ▪ Some use of concepts. ▪ Structured but bitty or sometimes unconnected. ▪ Descriptive without analytic purpose. ▪ A surface approach to literature reviewed. ▪ Does not stimulate reader's interest. ▪ Any artefact is of satisfactory quality.
45% (3rd class)	<ul style="list-style-type: none"> ▪ Grasp of basics. ▪ Descriptive - "surface" approach - little analysis - does not discuss topic. ▪ Limited understanding of relevance to the wider field. ▪ Failure to present the work in a context that the reader can understand. ▪ Any artefact works but has bugs.
35% (fail)	<ul style="list-style-type: none"> ▪ Descriptive with little or no analysis. ▪ Confused or wrong over theory and concepts. ▪ Little evidence of reading. ▪ Irrelevant and muddled. ▪ Any artefact does not work.
25% (fail)	<ul style="list-style-type: none"> ▪ Brief description but no analysis. ▪ Lots of errors of fact. ▪ No evidence of reading. ▪ Any artefact is substantially incomplete.
15% (fail)	<ul style="list-style-type: none"> ▪ Little description of relevance but may define the project area or state one issue relevant to the project. ▪ Structure and/or writing style make report difficult to read. ▪ A necessary artefact was not constructed.
5% (fail)	<ul style="list-style-type: none"> ▪ No substantive content but may state something about the project. ▪ No evidence of any work being done.
0%	<ul style="list-style-type: none"> ▪ Nothing submitted.

Coursework Submission Dates

Research Methods

Students will be expected to submit their reports by use of the online drop-box by 15:00 hrs GMT on the Friday of the 12th week after the beginning of the module. Dates will be posted on the Module homepage and on the 'Assessment' page of the site.

Project

Project submission will be carried out in a different way to the submission of the Research Methods report. Students have a year in which to complete their project, and within that year there are four possible submission dates. Students choose a preferred submission date at the start of their Project preparation. If students wish to move to a later submission date, this can be done in agreement with their project supervisor and account manager. More details on submission procedures will be provided on the module site.

Submission dates will be posted on the module homepage.

Coursework submissions will not be accepted unless they contain a cover sheet (available from the forms section of the 'MSc Strategic Business IT' site).

Important Submission Details

(As stated in the Academic Regulations – Examination and Assessment Regulations, AR.1.10 Version 3.3)

11. iv. Coursework submitted on or before the published submission date will be marked promptly and returned to students, with feedback within the prescribed time... (as detailed above).

v. Coursework submitted after the published submission date, but within two weeks of that date ... will be marked. The mark awarded will be limited to the unit pass mark, but the uncapped mark must also be shown on the coursework.

vi. Coursework submitted more than two weeks after the published submission date will be marked, but a mark of zero will be recorded on the student's record.

vii. The requirements... relating to feedback and prompt return of work (as detailed above) will not apply to work that is submitted late.

Please bear in mind that Extenuating Circumstances as detailed below may affect these marks when taken to the UAB.

Procedure for the release of marks and feedback

Provisional marks for the Research Methods module will be made available to students within four weeks of the submission deadline. These provisional marks will be subject to change and/or moderation until they are finally determined by the UAB. Students will be informed of any changes to their mark after the UAB has taken place. More details will be posted on each unit's noticeboard nearer the time.

Deferrals and Referrals

If, at your first attempt at a unit, you do not get an overall mark of 40%, then you will not have

passed the unit. In educational language you will not have met the learning objectives of that unit! The Unit Assessment Board that looks at your results will then make one of a number of decisions concerning your case. If this is the first time that you have taken the unit the most likely decision is that you will be given a referral (in University of Portsmouth terminology this is now called a Limited Repeat Assessment or LRA for short). You will find more details about referrals or LRAs in another FAQ below.

If you are being considered after doing a LRA which you have not passed, the UAB will set your result to a Fail for that unit. You can then be asked to undertake a Repeat Assessment by the Board of Examiners, see FAQs below for more detail.

Referrals or Limited Repeat Assessments (LRA)?

A referral or LRA occurs when you have failed to meet the learning outcomes of a unit that you have studied. The Unit Assessment Board will specify a piece of work or pieces of work that you must undertake in order to pass the unit, that is to meet the learning outcomes. The most common cases are where the coursework and examination for a unit are assessing different learning outcomes and you have, for example, not passed the coursework, then you will be asked to do another coursework. Sometimes, a completely new piece of work will be set which is set specifically for referral or LRA students and assesses all of the learning outcomes of the unit.

You will be sent details of exactly what you are required to do for your referral or LRA and also, and this is most important, the time by which it must be achieved. If you do not successfully pass the LRA assessment in the timescale laid down then you will have lost your referral or LRA and will then have to undertake a Repeat Assessment (see FAQ below). If you have been given a referral (LRA) in a unit, to pass that unit you must get a minimum of 40% in the referral assessment that is set for you. Once you have done that, the Unit Assessment Board will give you credit for that unit. However, the mark that you gained for that unit, (and the mark that will be used to contribute towards your final degree) will only be 40% no matter how well you did in the assessment.

Repeat Assessments (RA)/Resits

A Repeat Assessment as the University of Portsmouth calls it, is when you are required to redo all the assessments of a unit. Students who are given a Repeat Assessment are normally advised to attend the unit, that is to join the next official run of the unit and to study it with that group of students. However, there is no requirement for the student to do this, all that is required is that the complete set of assessments are submitted. The assessments will be marked in the normal way and an overall mark for the unit calculated in the normal way, that is by combining both coursework and examination marks. If the overall mark for the unit is 40% or higher then you will have passed your repeat assessment. The Unit Assessment Board will then award the credit points for that unit. However, the mark that is given for that unit, and the mark therefore that is used in the calculation of your degree, will only be 40%.

Deferrals

A deferral occurs when you have failed to meet the learning outcomes of a unit that you have studied but have submitted an ECF. The Unit Assessment Board will specify a piece of work or pieces of work that you must undertake in order to pass the unit, that is to meet the learning outcomes. Unlike a referral where your mark is capped at 40%, your deferral mark will not be capped.

You will be sent details of exactly what you are required to do for your deferral and also, and this is most important, the time by which it must be achieved. If you do not successfully pass

the deferral assessment in the timescale laid down then you will have lost your deferral and you will then have to undertake a Limited Repeat Assessment (see FAQ above). Please refer to the Academic Regulations for more details.

The Appeal Process

If you have any queries relating to the assigned mark or if there has been some error in the marking, you should approach the relevant Module facilitator and ask for the work to be re-marked. This should be done in writing within 2 weeks of the date that the assessment was made available for return. If you feel after re-marking that the mark is still not a fair reflection of the work submitted then you should further query the mark, giving reasons, in writing to the Head of Department within 2 weeks of the re-marked work being returned to you.

If, after exhausting all these procedures within the department, you wish to take the matter further you may formally appeal - see below. It may be a good idea at this stage, or even before, to contact your Account Manager. In the first instance, however, it is usually best to contact the Module facilitator for some informal feedback.

Formal Appeals

To mount an appeal you should first contact the chairman of the Board of Examiners who may be able to resolve the difficulty. Failing this, an appeal should be made, in writing, to the Academic Registrar within 14 days of the date of the official notification of the academic decision. However, the only grounds, which must be supported by evidence, on which an appeal will be considered are:

- The Board of Examiners was unaware of some significant factor that may have affected the academic decision.
- That procedures for the conduct of the assessment were not properly followed.

Awards of MSc

If you have completed the PgD and top up you will receive a Master of Science Degree. However, you may be eligible to receive an award with Merit or Distinction if you meet the criteria as outlined below. Only the units you have studied as part of the top up will be considered in the grading of the MSc. The grade boundaries are as follows:

Distinction: 70% +

Merit: 60% - 69%

Pass: 40% - 59%

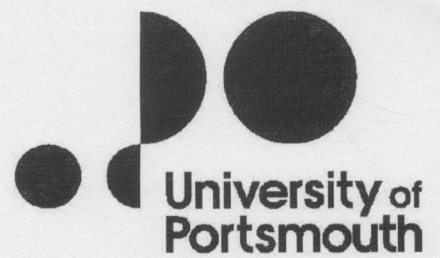
A student will achieve these grades for the overall MSc if he/she achieves the above grades in both units (Research Methods and Project). That is, for a student to achieve a distinction overall in the MSc, he/she must achieve above 70% in each unit (not an average over both units), and this must be achieved at the first attempt.

Extenuating circumstances

If you experience circumstances relating to your health and/or personal life which are of a sufficiently serious nature to result in **either** you being unable to participate, complete or submit an assessment on time or your performance in an assessment being significantly affected then it may be appropriate for you to complete an extenuating circumstances form (ECF). The form can be downloaded from the course website or emailed to you by your account manager. Consult your account manager or module facilitator on how to complete the form.

At the end of each semester a panel of senior academics will convene to review these claims and determine whether the extenuating circumstance is valid (accepted) or invalid (not accepted).

Students must be prepared to complete missed or incomplete examinations or coursework, even though their studies may have been disrupted through no fault of their own, e.g. illness. For more details consult the 'Extenuating Circumstances Guidelines for Students' (link on 'MSc Strategic Business IT' site).



Student Handbook
MSc Strategic Business IT
(Online)

June 2005

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Welcome

Studying for a University qualification by distance learning is a major commitment. The University of Portsmouth has delivered distance learning courses for many years, so we have a lot of experience to help you reach your goals.

At the University we provide study opportunities of the highest quality at undergraduate, postgraduate and research level.

This course aims to provide you with skills for life as well as learning. The importance that we place on this reflects the concern of future employers that you should develop team and individual skills as well as academic knowledge. Our success in achieving this, with our recognised quality standards and excellent contacts with employers in the UK and overseas, helps explain the success of our graduates in gaining employment and advancing rapidly in their chosen careers. Finally, we are a growing, dynamic, multi-cultural community in which each individual student is assured of respect and privacy, but is able to gain support and advice where it is needed.

Dr. Simon Claridge
Dean of the Faculty of Technology

Course Introduction

This programme is a follow-up to the NCC's Postgraduate Diploma in Strategic Business IT, which is designed to build on individuals' existing IT skills and develop the skills and knowledge to undertake IT management responsibilities and senior roles. It will also provide students with an understanding of the strategic issues associated with businesses operating within the IT environment.

Delivery Model

The programme is delivered as follows:

Activity

Induction Course

Research Methods Taught Module and Project Module

Project Preparation (under staff supervision)

Duration

1 week

12 weeks 3m

13 weeks minimum 3m + 1w

The two units run in a semi-parallel mode as there are several key areas of overlap between them that would benefit from this right from the start. Students are encouraged to work on their project idea and as a mechanism for gaining facility in research ideas.

The Modules

A module is a learning component of a complete study plan covering a particular subject area. Please note that here at the University modules are called units. For this course we have changed most documentation to call them modules but please bear in mind that they both mean the same thing.

Credit Points - every completed module of a study plan is signalled by the award of credit points; in this case 15 credits for the Research Methods module and 45 credits for the Project module. In order to be eligible for a Masters award you must have acquired 180 credit points from the modules that you have studied. (In this case you already have 120 credit points acquired from the postgraduate diploma).

The Module specifications can be found by following the relevant link on the 'MSc Strategic Business IT' WebCT homepage.

Programme Structure

Week 1	Induction	
Week 2	Research Methods and Project Units	Lesson 1
Week 3		
Week 4	Lesson 2	
Week 5		
Week 6	Lesson 3	
Week 7		
Week 8	Lesson 4	
Week 9		
Week 10	Lesson 5	
Week 11		
Week 12	Lesson 6	
Week 13		
Weeks 14 -	Project Preparation	

Learning Model

All Modules will have an appropriate learning strategy. There are many views on how high quality learning can be achieved. However, there does seem to be good evidence to support the following learning model:

المشكلة
المشاكل
Problem centred - in that the learning is guided by a problem-solving outlook.

المثابرة
Perseverance - in that students require, for high quality learning, consistent and directed effort, guided by the facilitator.

الممارسة
Practice - is needed if true learning is to be achieved. This will be enabled by means of discovery sections in each on-line lesson.

التدريج
Progressive - in that the lessons are designed to build complex ideas from simple ones.

Private - in the sense that there is no need to teach every element of a particular knowledge domain, rather the facilitator should guide the student and only intervene when genuinely difficult ideas/materials are involved.

Public - or group learning because there is great value in learning in groups where we can exchange ideas, learn to be open-minded and build learning communities. This is facilitated by asynchronous on-line discussion and synchronous chat rooms.

The overall philosophy of any successful on-line learning strategy is to place the learner at the centre of a network of support structures and activities. Utilizing both synchronous and asynchronous collaborations with fellow learners as well as facilitators, and drawing upon the potential of the Internet to deliver information at any time to any place, the learner is empowered to structure and control their learning in a way that is uniquely suitable to them.

Delivery Method

This course is made up of 3 components:

Online Course Material – lesson content is accessible online through WebCT.

Textbooks – within the lesson content, there are references to the textbooks which are required for the Module/s. Students are expected to allocate time in their own schedule to complete the reading for particular lesson/s.

Communication – communication is carried out by the use of asynchronous discussion boards and synchronous chat rooms.

Asynchronous communication - Students are set discussion questions every week and are expected to review the discussion boards every other day and post comments.

Synchronous communication - Every week a chat session is held where the facilitator poses a question to all those that can attend and students can discuss the question with facilitator support. (The chat session is very much like a taught seminar/tutorial held online.)

More details on how to access the Learning site and participate in online communication can be found in the **Website Guide**.

Learning Materials

It is a prerequisite of this course that every student must purchase their own copies of the recommended textbooks for these two modules, which are as follows:

Research Methods module

Robson, W., (1997), *Strategic Management & Information Systems*, FT Prentice Hall. ISBN: 0 273 61591 2

Saunders, M. et al, (2002), *Research Methods for Business Students*, 3e, FT Prentice Hall. ISBN: 0 273 6580 4 2

Triola, M. F. 2003. *Elementary Statistics Using Excel*, 2nd edn, Addison-Wesley

Project module

Dawson, C. W., (1999), *The Essence of Computing Projects: A Student's Guide*, Prentice Hall. ISBN: 0 130 21972 X

Salkind, N. J., (2003), *Exploring Research*, 5th ed, Prentice Hall. ISBN: 0130983527

Study Hours

Module 1: Research Methods

Directed self study and contribution to discussion boards 96 hours (16 hours/week)

Contribution to chat rooms 6 hours (1 hour/week)

Module 2: Project

(Taught course)

Directed self study and contribution to discussion boards 80 hours (16 hours/week)

Contribution to chat rooms 5 hours (1 hour/week)

Staff Roles and Contact Details

There are a number of staff who work together to run your course and provide support. The following outlines the various roles. Contact details can be found on any of the module sites.

Facilitator 1

Facilitators are assigned to each module and provide academic support. They will review the discussion boards daily, conduct the chat sessions every week and can be contacted by the WebCT email with regards to any module queries. Your facilitator will also mark your assessments and provide feedback on them.

We will endeavour to answer your queries within 48 hours of receipt during University Office Hours as below.

Account Manager 2

Your account manager can deal with any non-academic queries you may have and can provide general course information. If you have a technical problem, you will need to contact the Account Manager as well and they will be able to advise you on a solution. They can be contacted by use of the Account Manager area of the discussion board and by email within WebCT. For technical queries which mean that WebCT can not be accessed please email anna.caudrey@port.ac.uk or telephone +44(0)23 9284 3102.

We will endeavour to answer your queries within 48 hours of receipt during University Office Hours as below.

Project Supervisor 3

As well as having a facilitator for the project module, you will also be assigned a project supervisor. Their role is to assist you and guide you through the development of your project and act as academic support for this part of the course.

Office Hours

Monday to Thursday 08:30 – 17:15 GMT

Friday 08:30 – 16:15 GMT

7
1
2
3
4
5
6

5:15
8:30 - 17:15
4:15
8:30 - 16:15

Data Driven Research Methodology

- No clear research hypothesis at the start of the research
- But significant amounts of data available
- No clear idea of which statistical/analytical methods to use
- Assumption that somewhere in the data there is knowledge to be discovered ('knowledge discovery in data' – KDD)
- Differs from data mining in that no clear outcomes/categories exist in the data
- The task is to find natural groupings in the data that can be used to generate a research hypothesis for further testing through traditional research methods

1

'Classical research methodology'

- Understand the research problem
 - review previous work (literature review) in the domain
 - summarise problems with existing work
 - formulate research statement
- Identify methods to be adopted for analysis
 - propose specific research hypotheses
 - identify data collection methods
 - identify statistical/analytical methods for determining truth or falsity of hypotheses
- Collect data and analyse using the methods specified above
- Analyse results against hypotheses and interpret the results
- Conclude with hypotheses for further testing

2

Collecting data

- The PQ administered as post-consultation (“exit”) survey with intention of securing at least 60 fully completed questionnaires per doctor
- Contributing volunteer doctors invited to identify and supply the names and contact details (work address, telephone, e-mail, relationship to the contributing doctor) of up to 20 colleagues, approximately half of whom should be medical peers, the other half being drawn from a variety of individuals whom the doctor judged might have had some insight into his/her medical practice in its widest sense.



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Understanding the patient data (5910 responses)

PQ

		Statistics						
N	Valid	Q3A	Q3B	Q3C	Q3D	Q3E	Q3F	Q3G
	Missing	5828	5829	5817	5720	5629	5384	5289
		82	81	93	190	281	526	641
Mean		4.87	4.83	4.82	4.79	4.77	4.75	4.79
Std. Error of Mean		.006	.006	.006	.007	.007	.008	.007
Median		5.00	5.00	5.00	5.00	5.00	5.00	5.00
Mode		5	5	5	5	5	5	5
Std. Deviation		.431	.484	.489	.528	.553	.573	.521
Variance		.186	.234	.240	.279	.306	.329	.271
Skewness		-3.928	-3.389	-3.312	-3.093	-2.900	-2.694	-2.942
Std. Error of Skewness		.032	.032	.032	.032	.033	.033	.034
Kurtosis		19.179	14.137	13.516	11.723	10.015	7.858	10.108
Std. Error of Kurtosis		.064	.064	.064	.065	.065	.067	.067
Minimum		1	1	1	1	1	1	1
Maximum		5	5	5	5	5	5	5

Skewness: A measure of the asymmetry of a distribution. The normal distribution is symmetric, and has a skewness value of zero. A distribution with a significant positive skewness has a long right tail. A distribution with a significant negative skewness has a long left tail. As a rough guide, a skewness value more than twice its standard error is taken to indicate a departure from symmetry.

Kurtosis: A measure of the extent to which observations cluster around a central point. For a normal distribution, the value of the kurtosis statistic is 0. Positive kurtosis indicates that the observations cluster more and have longer tails than those in the normal distribution and negative kurtosis indicates the observations cluster less and have shorter tails.

Interim report on main study

PQ: average score across the seven professionalism items is 4.81 with average standard deviation of 0.14 for the 5910 patient responses for 152 doctors.

PQ: Cronbach alpha 0.93, inter-rater agreement 0.69

CQ: average score across the 14 professionalism items is 4.69 with average standard deviation of 0.6 for the 2763 colleague responses for 195 doctors.

CQ: Cronbach alpha 0.91, inter-rater agreement 0.42

Therefore, both questionnaires are highly reliable with strong inter-rater agreement



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Second level analysis for interim study

Using a minimum number of 8 colleague responses and 12 patient responses resulted in 83 doctors with an average of 14 colleague responses and 39 patient responses.

The average across all seven aggregated PQ items was 4.83 and all 14 CQ items 4.69 which, when combined, resulted in an overall mean of means of 4.74.

Interim study confirms findings of several previous studies that data is highly skewed towards the top end of scale, with small standard deviations.



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Towards a model that fits the data

ANOVA						
	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Q3A_MEAN	.072	1	.017	81	4.283	.042
Q3B_MEAN	.097	1	.019	81	5.129	.026
Q3C_MEAN	.147	1	.020	81	7.389	.006
Q3D_MEAN	.156	1	.021	81	7.401	.006
Q3E_MEAN	.077	1	.019	81	3.951	.050
Q3F_MEAN	.143	1	.027	81	5.257	.024
Q3G_MEAN	.119	1	.020	81	5.856	.018
Q1_MEAN	.540	1	.017	81	31.268	.000
Q2_MEAN	.398	1	.024	81	16.353	.000
Q3_MEAN	1.643	1	.026	81	63.764	.000
Q4_MEAN	.913	1	.027	81	33.313	.000
Q5_MEAN	1.307	1	.036	81	35.855	.000
Q6_MEAN	2.101	1	.054	81	38.986	.000
Q7_MEAN	.888	1	.041	81	21.432	.000
Q8_MEAN	.154	1	.029	81	5.327	.024
Q9_MEAN	.652	1	.036	81	18.119	.000
Q10_MEAN	1.909	1	.064	81	30.027	.000
Q11_MEAN	2.217	1	.045	81	49.473	.000
Q12_MEAN	1.165	1	.015	81	76.472	.000
Q13_MEAN	2.347	1	.050	81	47.393	.000
Q14_MEAN	1.507	1	.071	81	21.109	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

If there is no difference in the means of these items, the between-cluster variance will be approximately equal to the within-cluster variance and the F test value will be close to 1.

However, when the means differ significantly, the between-cluster variance will be much larger than the within-cluster variance and the F test value will be significantly greater than 1.

Hence CQ 12, CQ 3, CQ 11, CQ 13 are the most important of the colleague items

PQ 3d, PQ 3c, PQ 3g are the most important patient items

This information can be used to generate new hypotheses for further empirical test

13

Conclusion

Research methodology can be both 'top-down' as well as 'bottom-up', and can be iterative

Data driven methodology useful for identifying hypotheses for further empirical test

Useful for generating models that fit the data

Commercial advantages of KDD and data driven methods still not fully exploited by organisations storing huge amounts of archived data

'There is gold in them there hills...' that can inform business strategy and commercial exploitation

14

Introduction

Regulation of the UK medical profession is highly topical, following the publication of Fifth Report of the Shipman Inquiry and various responses and reports including, for instance, the recent Royal College of General Practitioners' report* and the CMO's *Good Doctors, Safer Doctors* consultation paper.[†] It is not currently clear whether there will be a re-licensing process based on a revised NHS appraisal system and a relevant medical Royal College re-certification processes for each doctor. There are a number of open questions concerning not only how to assess doctors' skills and competencies but also what to do with the data in terms of identifying doctors who may require further scrutiny.

There is growing interest in the UK and internationally in the role of peer assessment and patient feedback for the purpose of appraisal, revalidation and clinical governance.^{3,2} Several well-established peer and colleague assessment questionnaires now exist, including 'Professional Associate Rating' (PAR)³ and 'Peer review evaluation form' (PREF).⁴ The Alberta 'Peer Assessment Questionnaire'⁵ has evolved into the Medical Colleague Assessment Questionnaire (MCAQ) and the Co-worker Assessment Questionnaire (CWAQ).^{**} MCAQ contains 31 statements about physician practices for five attributes: clinical competency, psychosocial management of patients, patient interaction, professional self-management, and consultation communication, while CWAQ contains 17 statements about physician practices for three attributes: patient interaction, co-worker collegiality and co-worker communication. SPRAT (Sheffield peer assessment tool)⁶ is a recent UK addition designed to assess the components of trainee paediatricians. The questionnaire consists of 24 items covering: good clinical care; maintaining good medical practice; teaching and training, assessing and appraising; relationships with patients; and working with colleagues.

With regard to patients, the Alberta programme developed the patient assessment questionnaires (PAQ) that contained 40 statements about physicians' practices for 7 attributes: patient interaction, phone communication, information for patients, personal communication, office staff, physical office and appointments.^{††} GPAQ (General Practice Assessment Questionnaire) is a recent revision to GPAS (General Practice Assessment Survey)⁷ developed at the National Primary Care Research and Development Centre in Manchester and uses questions on access, inter-personal aspects of care and continuity of care as well as other aspects of quality not covered elsewhere in the 2003 GP contract. There is also a significant body of work on patient-based questionnaires, principally in

**Seven Days: A Weekly Bulletin of Professional News, Guidance and Policy for Primary Care*. 10th-16th July 2006. Available from <http://www.rcgp.org.uk/default.aspx?page=4336>.

†*Good doctors, safer patients: Proposals to strengthen the system to assure and improve the performance of doctors and to protect the safety of patients. A report by the Chief Medical Officer*. 2006. Department of Health Report 276071. Available from <http://www.dh.gov.uk/assetRoot/04/13/70/78/04137078.pdf>.

** Final report: A pilot study of the Alberta physician achievement review (PAR) program in Nova Scotia. 2003. Dalhousie University. Available from <http://www.nspar.ca/2003-cme.pdf>.

†† Final report: A pilot study of the Alberta physician achievement review (PAR) program in Nova Scotia. 2003. Dalhousie University. Available from <http://www.nspar.ca/2003-cme.pdf>.

Table 1: Structure of the GMC patient and colleague questionnaires

Patient and Colleague Questionnaires – Questionnaire Structure		
Core domains	PQ Number of items	CQ Number of items
Introduction/explanation	+	+
Reason for attendance	2	-
Core questions on professionalism	7	14
Global assessments	3	4
Previous experience of this doctor	1	-
Demographics/ethnicity	3	3
Free text	+	+
Professional role and frequency of contact with indexed doctor	-	2
Total	16	23

For the core questions on professionalism 5-point Likert scale items were used (poor, less than satisfactory, satisfactory, good, very good) and, for the global assessment, a combination of Likert scales and binary (yes/no) items. The results reported here focus solely on the seven professionalism items of PQ and ten of CQ. The seven PQ items on professionalism address politeness, making the patient feel at ease, listening, assessing medical condition, explaining the medical condition, patient involvement in decision making and arranging treatment. The 14 CQ professionalism items address clinical knowledge, diagnosis, clinical decision making, treatment, prescribing, medical record keeping, working within limitations, keeping knowledge and skills up to date, self-reflection, teaching, supervising, patient commitment, communication with patients and relatives, and working with colleagues.

The PQ was administered as a post-consultation (“exit”) survey with the intention of securing at least 60 fully completed questionnaires. Contributing volunteer doctors were invited to identify and supply the names and contact details of up to 20 colleagues, who were approached directly by email and invited to complete a web-based, online CQ to assess the performance of the (named) doctor. Colleagues were assured that the index doctor was contributing to the study on a voluntary basis and that the doctor was not the subject of any competence, health, or disciplinary investigation. Data collection with a national cohort of doctors is on-going and but sufficient colleague and patient data for 83 doctors from around the UK now exists for an interim analysis to be made here.

Collection and management of data

All questionnaire data were cleaned during the data entry process, with missing data clearly identified and text comments stripped of any patient or doctor identifiers. Missing data were coded as such, rather than being imputed. A 10% random sample of PQ and CQ returns were double entered to examine the magnitude of data entry error (the observed rates were negligible).

Analysis

Item-internal consistency was examined using mean scores, standard deviations and Pearson correlation between the item and any scale to which it was assigned. Internal consistency reliability was examined by calculating Cronbach’s alpha and interclass correlation coefficient analysis (ICC – a measure between -1 and +1) to check on inter-

provides, for each doctor, a summary of how often their aggregated mean scores for the 21 items fell above or below the cohort means for those items and how many times they came bottom or top of their group for these 21 items. Cluster analysis of these 83 doctors (Figure 1) using all 21 aggregated items revealed two major clusters.

Discussion

Assessment of doctors consists of two phases: how to collect the data, and what to do with it. With regard to the first phase, preliminary results indicate that the GMC questionnaires are highly reliable and lead to high inter-rater agreement. Factor analysis of the patient questionnaire indicates no redundancy among the items (only one component was extracted), and similarly for the colleague questionnaire, although both these results are provisional until the full dataset is analysed. However, the use of just seven PQ items and 14 CQ items with 5-point Likert scales currently appears to be sufficient for obtaining highly reliable assessment data concerning professional aspects.

With regard to the second phase, while a measure of how a doctor's performance compares to the rest of the cohort can be gleaned from a comparison with cohort averages across items (Table 2), this does not take into account the magnitude of the variance. One or two 'rogue' responses from patients or colleagues, for instance, can lead to a doctor appearing to perform weakly by lowering the averages just below the mean.

Cluster analysis, however, takes the magnitude of variance into account (Figure 1). The tree reveals two major clusters: Doctors 49, 59, 39, 80, 33, 25, 73 and 48 (bottom of diagram), and the rest. Doctor 49 with 20 below-average assessments and seven bottom performances (Table 2) is the 'worst performer' relative to all other doctors in the cohort. The cluster diagram also identifies doctors 59 (16 below average, 5 bottom), 39 (18,2), 80 (20,1), 33 (20,1), 25 (19,0), 73 (11,1) and 48 (16, 0) as falling in a separate cluster from all other doctors. At the other end of the clustering, doctor 38 was above average on 20 items and came top (or equal top) on six others. Doctors 44 (19, 4), 4 (20,3), 65 (19,7) and 15 (19,4), and all the other doctors down to Doctor 32 (16, 4) also performed well in comparison to the cohort, although the number of below average performances increases as we move down that cluster.

Limitations and strengths

No attempt has so far been made to relate the seven professionalism items on PQ with the 3 summative/global items on the same questionnaire, and similarly with the 14 professionalism items on CQ with the four summative/global items. Also, no attempt has been made to separate patient and colleague responses by the specialism or category of doctor to check for sub-cohort differences. Both will happen once all responses are received for the 500 or so doctors already recruited. While a very small number of doctors has been separated from the main cohort through cluster analysis, it must be stressed that the professional performance of all these doctors is satisfactory in absolute terms and that the great majority are obtaining aggregated scores in the 4-5 (good to very good) range.

Table 2: The total number of items for which each doctor falls either below (<) or above (>) the means for the cohort as a whole, and the number of items for which a doctor comes bottom or top (perhaps tied).

Dr ID	<	>	bottom	top
1	1	20	0	8
2	5	16	1	6
3	6	15	0	1
4	1	20	0	3
5	12	9	0	1
6	3	18	0	3
7	2	19	0	1
8	16	6	0	0
9	14	7	0	1
10	3	18	0	10
11	3	18	0	0
12	4	17	0	5
13	2	19	0	3
14	6	15	0	0
15	2	19	0	4
16	7	14	0	0
17	10	11	0	1
18	11	10	0	2
19	6	15	0	0
20	5	16	0	1
21	10	11	0	0
22	6	15	0	0
23	12	9	0	0
24	5	16	0	3
25	19	2	0	0
26	9	12	0	1
27	10	11	0	1
28	10	11	0	1
29	17	4	0	1
30	5	16	0	2
31	7	14	0	6
32	5	16	0	4
33	20	1	1	0
34	2	19	0	5
35	13	8	0	0
36	4	17	0	0
37	6	15	0	6
38	1	20	0	6
39	18	3	2	0
40	6	15	0	2
41	6	15	0	1
42	10	11	0	0
43	10	11	0	0
44	2	19	0	4
45	8	13	0	1
46	14	7	0	1
47	2	19	0	2
48	16	5	0	0
49	20	1	7	0
50	14	7	0	1
51	4	17	0	1
52	9	12	0	1
53	9	12	0	2
54	15	6	0	0
55	6	15	0	6
56	2	19	0	3
57	14	7	0	1
58	14	7	0	0
59	16	5	5	0
60	15	6	0	0
61	10	11	1	2
62	14	7	0	0
63	12	9	0	0
64	10	11	0	0
65	2	19	0	7
66	11	10	0	0
67	16	5	0	0
68	6	15	0	6
69	10	11	0	0
70	4	17	0	1
71	4	17	1	4
72	3	18	0	6
73	11	10	1	0
74	12	9	0	0
75	1	20	0	2
76	7	14	0	1
77	14	7	0	0
78	6	15	0	5
79	8	13	0	2
80	20	1	1	0
81	5	16	0	0
82	3	18	0	3
83	13	8	1	0

References

- 1 Norcini J. Peer assessment of competence. *Med Educ* 37:539-43, 2003.
- 2 Evans R, Elwyn G, Edwards A. Review of Instruments for Peer Assessment of Professionals. *BMJ*, 328: 1240-5, 2004.
- 3 Ramsey PG, Carline JD, Blank LL, Wenrich MD. Feasibility of hospital-based use of peer ratings to evaluate the performance of practicing physicians. *Academic Medicine*, 71:364-370, 1996.
- 4 Thomas P, Gebo K, Hellmann D. A pilot study of peer review in residency training. *J Gen Intern Med* 1999;14: 551-4.
- 5 Hall W, Violato C, Lewkonja R, Lockyer J, Fidler H, Toews J, Jennett P, Donoff M, Moores D. Assessment of physician performance in Alberta: The Physician Achievement Review. *CMAJ*, 161:52-7, 1999.
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- 8 Kristjanson LJ, Sloan JA, Dudgeon D, Adaskin E. Family members' perceptions of palliative cancer care: predictors of family functioning and family members' health. *J Palliat Care* 1996, 12(4): 10-20.
- 9 Higginson IJ, Finlay I, Goodwin DM, Cook AM, Hood K, Edwards AG, Douglas HR, Norman CE.: Do hospital-based palliative teams improve care for patients or families at the end of life? *J Pain Symptom Manage* 2002, 23(2):96-106.

4	Please decide how strongly you agree or disagree with the following statements by ticking <u>one</u> box along each line.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Does not apply
a	I am confident that this doctor will keep information about me confidential	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
b	I am confident that this doctor is honest and trustworthy	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

5	I am confident about this doctor's ability to provide care	Yes 1 <input type="checkbox"/>	No 2 <input type="checkbox"/>
---	--	--------------------------------	-------------------------------

6	I have no reservations about seeing this doctor again	Yes 1 <input type="checkbox"/>	No 2 <input type="checkbox"/>
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7	Was this visit with your usual doctor?	Yes 1 <input type="checkbox"/>	No 2 <input type="checkbox"/>
---	--	--------------------------------	-------------------------------

The following questions provide us with general information only about the range of people who have responded to this survey.
We will not use this information to identify you and we will keep it confidential.

If you are filling this in on behalf of a child or disabled patient, please tick appropriately for the patient

8	Are you:	Female 1 <input type="checkbox"/>	Male 2 <input type="checkbox"/>
---	----------	-----------------------------------	---------------------------------

9	Age:	Under 15 yrs 1 <input type="checkbox"/>	15-20 yrs 2 <input type="checkbox"/>	21-40 yrs 3 <input type="checkbox"/>	41-60 yrs 4 <input type="checkbox"/>	Over 60 yrs 5 <input type="checkbox"/>
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10	What is your ethnic group? Please tick <u>one</u> box from the following selection to indicate your cultural background. (We will use this information for this study only)	1 <input type="checkbox"/> White British	7 <input type="checkbox"/> Pakistani
		2 <input type="checkbox"/> White Irish	8 <input type="checkbox"/> Bangladeshi
		3 <input type="checkbox"/> White and Black Caribbean	9 <input type="checkbox"/> Caribbean
		4 <input type="checkbox"/> White and Black African	10 <input type="checkbox"/> African
		5 <input type="checkbox"/> White and Asian	11 <input type="checkbox"/> Chinese
		6 <input type="checkbox"/> Indian	12 <input type="checkbox"/> Any other (please say which):

	Please feel free to add any other comments you have about this doctor.
--	--

Thank you for your time and help



The following questions provide us only with general information about the range of people who have responded to this survey.
This information will not be used to identify you and will remain confidential.

19

Are you: Female ☐ Male ☐

20

Your age: _____

21

Your professional role (please tick only one box):

- 1 ☐ Doctor If you are a doctor, are you on a training grade? Yes ☐ No ☐
- 2 ☐ Registered Nurse 7 ☐ Pharmacist
- 3 ☐ Allied Healthcare Professional 8 ☐ Practice Manager
- 4 ☐ Midwife 9 ☐ Administrator
- 5 ☐ Health Visitor 10 ☐ Other (please specify): _____
- 6 ☐ Health Care Assistant

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How recently were you familiar with this doctor's clinical practice?

- 1 ☐ Current colleague 2 ☐ Within the last 2 years
- 3 ☐ Between 2 and 5 years ago 4 ☐ Between 5 and 10 years ago 5 ☐ More than 10 years ago

23

During this period of your familiarity with this doctor's clinical practice, how often did you have contact with the doctor?

- 1 ☐ Most days 2 ☐ Weekly 3 ☐ Monthly 4 ☐ Less often

24

What is your ethnic group? Please tick one box from the following selection to indicate your cultural background. (We will use this information for this study only)

- 1 ☐ White British 7 ☐ Pakistani
- 2 ☐ White Irish 8 ☐ Bangladeshi
- 3 ☐ White and Black Caribbean 9 ☐ Caribbean
- 4 ☐ White and Black African 10 ☐ African
- 5 ☐ White and Asian 11 ☐ Chinese
- 6 ☐ Indian 12 ☐ Any other (please say which): _____

Please feel free to add any other comments you have about this doctor.

Thank you for your time and help



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Colleague Questionnaire for

Thank you for agreeing to complete this questionnaire about the above doctor.

- All information will be kept **confidential** to the study team
- The doctor will not see your answers, so please give honest feedback
- Please do not write your name on this survey
- Please only answer those questions on which you feel able to give an opinion

Please rate your colleague in each of the following areas by ticking one box along each line.		Poor	Less than satisfactory	Satisfactory	Good	Very Good	Don't know
1	Clinical knowledge	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
2	Diagnosis	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
3	Clinical decision making	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
4	Treatment (Including practical procedures)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
5	Prescribing	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
6	Medical record keeping	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
7	Recognising and working within limitations	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
8	Keeping knowledge and skills up to date	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
9	Reviewing and reflecting on own performance	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
10	Teaching (students, trainees, others)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
11	Supervising colleagues	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
12	Commitments to care and well being of patients	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
13	Communication with patients and relatives	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
14	Working effectively with colleagues	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

Please decide to what extent you agree with the following statements by ticking one box along each line.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Don't know
15	I am confident that this doctor respects patient confidentiality	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
16	I am confident that this doctor is honest and trustworthy	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
17	I am confident that this doctor's performance is not impaired by ill health	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

18	I am confident that this doctor is fit to practise medicine	Yes 1 <input type="checkbox"/>	No 2 <input type="checkbox"/>
----	---	--------------------------------	-------------------------------

Patient Questionnaire for

The General Medical Council (GMC) is proposing that all doctors will have to show that they are up to date and fit to practise medicine. They have arranged a test study to see if feedback from questionnaires is an effective means of assessing the skills of a doctor.

Your doctor is NOT being investigated by the GMC but has willingly agreed to contribute to the study.

- The feedback you give may be used to improve future healthcare
- All information will be kept **confidential** to the study team
- The doctor will not see your answers, so please give honest feedback
- Please do not write your name on this survey

When giving your feedback, please only consider the consultation you have had today.

1 Which of the following best describes the reason you saw the doctor today?
(please tick all the boxes that apply)

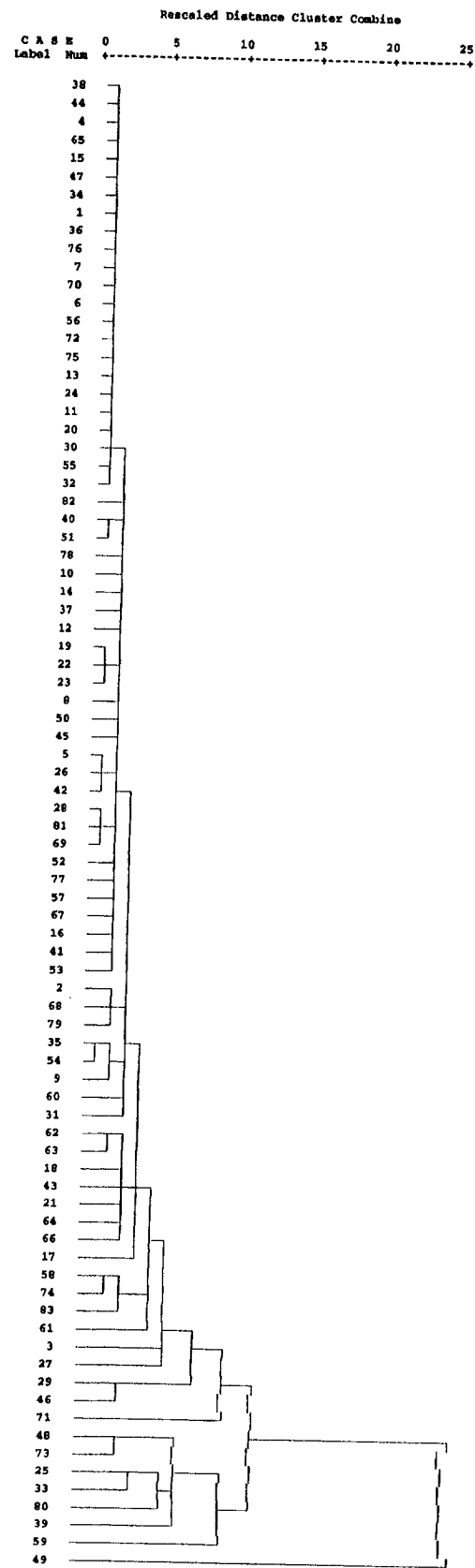
- | | |
|--|--|
| 1 <input type="checkbox"/> To ask for advice | 5 <input type="checkbox"/> Due to an ongoing problem |
| 2 <input type="checkbox"/> For treatment (including prescriptions) | 6 <input type="checkbox"/> Due to one off / isolated problem |
| 3 <input type="checkbox"/> For a routine check | 7 <input type="checkbox"/> Other (please give details) |
| 4 <input type="checkbox"/> Accompanying someone else | |

2 On a scale of 1 to 5, how important to your health and well-being was your reason for visiting the doctor today?

Not very important 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ Very important

3 Please rate how good your doctor was today at each of the following by ticking <u>one</u> box along each line.		Poor	Less than Satisfactory	Satisfactory	Good	Very Good	Does not apply
a	Being polite						
b	Making you feel at ease in his / her presence	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
c	Listening to you	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
d	Assessing your medical condition	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
e	Explaining your condition and treatment	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
f		1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
g	Providing or arranging treatment for you	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

Figure 1: Cluster analysis (dendrogram) of all 83 doctors.



Conclusion

It is still not clear how patient and colleague responses will feed into any revalidation process based on appraisal or other CPD processes and possible clinical tests. Nevertheless, the cluster analysis results indicate that it is possible to take a 'profile-wide' approach to identifying doctors who may require further scrutiny rather than an item-by-item approach. Also, the reliability results indicate that patient and colleague data, aggregated by individual doctor, can help generate profiles for such identification.

rater agreement. Cluster analysis was used on aggregated data for each doctor groups maximally distinct for the purposes of satisfactory and unsatisfactory practice.

Cluster analysis explores and mines data with the purpose of categorising different samples into groups such that the degree of association between two samples is maximal (their variance is minimal) if they belong to the same group and minimal (their variance is maximal) otherwise. In hierarchical cluster analysis, each object is initially assigned to its own cluster, followed by an iterative process whereby the two most similar clusters form a new cluster until one overall cluster results. The output is in the form of a taxonomy or hierarchical tree. Samples of increasing dissimilarity are aggregated at various levels of the tree using a rescaled metric (typically ranging from 1-25). A number of different distance measures are used to identify similarity/dissimilarity of objects. In the hierarchical cluster analysis results reported below, squared Euclidean distance (D) is adopted whereby the squared and summed differences across all 21 aggregated item

scores are calculated according to the formula: $D = \sum_{i=1}^q |S_i - S'_i|^2$, where q is the number

of questionnaire items, S and S' are two different doctors, and every doctor is compared pair-wise with every other doctor so that a 'similarity/dissimilarity' matrix results. A variety of methods also exist for combining clusters. The method adopted here (unweighted pair-group method using centroid average) calculates the distance between two clusters as the difference between their centroids, where a centroid is the average point in the multidimensional space formed by all 21 items. All analysis was undertaken with SPSS v12.

Results

For PQ (unaggregated by doctor) the average score across the seven professionalism items was 4.81 with average standard deviation of about 0.5 for the 5910 patient responses for 152 doctors. About 0.8% of all responses fell in the adverse categories (poor, less than satisfactory). Internal reliability via Cronbach alpha was 0.93 and the ICC 0.68, with 95% confidence interval 0.669 to 0.689. There were strong inter-item correlations (minimum 0.62, maximum 0.79, average 0.69) as well as strong item-scale correlations (minimum 0.78, maximum 0.81). When the seven items were summed to form a scale, the mean was 33.69/35 with standard deviation 2.98.

For CQ the average score across the 14 professionalism items was 4.69 with average standard deviation of 0.6 for the 2763 colleague responses for 195 doctors. About 0.5% of all responses fell in the adverse categories. Cronbach alpha was 0.91 and ICC 0.42, with 95% confidence interval of 0.401 to 0.445. Inter-item correlations ranged from 0.269 to 0.733 with an average of 0.435, and item-total correlations ranged from 0.52 to 0.71. The scale average was 65.72/70 with standard deviation 5.13.

The patient and colleague datasets were then aggregated by doctor for second level analysis. Using a minimum number of 8 colleague responses and 12 patient responses resulted in 83 doctors with an average of 14 colleague responses and 39 patient responses. The average across all seven aggregated PQ items was 4.83 and all 14 CQ items 4.69 which, when combined, resulted in an overall mean of means of 4.74. Table 2

the areas of family perception of care and patient perception of care, such as FAMCARE⁸ and the Palliative Outcome Scale (POS).⁹ In none of these studies is any systematic attempt made to aggregate information from colleagues and patients on individual doctors to provide an overall 360° colleague and patient-based view of specific doctors and other health professionals.

The Medical Council of New Zealand is subject to the Health Practitioners Competence Assurance Act (HPCAA) 2003.¹⁰ Each physician applies annually for a practising certificate and must declare their fitness to practise and participation in continuing professional development (CPD). If specific CPD requirements are not met, the physician is required to undergo evaluation based on the Alberta programme, entailing 360° feedback from 16 colleagues, 10 patients and self-assessment. A score of two standard deviations below the mean score will result in a suggestion from the Council that specific education in the relevant area is incorporated into the doctor's CPD for the following year. A score three standard deviations below the mean score will result in a requirement by the Council to incorporate education in the relevant area of the next year's CPD.¹¹

The use of standard deviations assumes the distribution of data is normal around the mean. However, a number of research studies, including that described here, indicate that colleague and patient data is highly skewed towards the top end (excellent/very good) of the Likert scale. Sometimes even one standard deviation from the mean can result in a score above the maximum possible (e.g. mean of 4.85 with standard deviation of ± 0.2 on a scale 1-5). Also, falling three standard deviations below the mean may result in a doctor still obtaining a score that means 'good' (e.g. average $4.85 - 3 \times 0.2 = 4.25$). If the questionnaires are reliable, normalisation procedures to re-distribute the data may not be justified.

The aim of the paper is to introduce an additional technique for identifying, on the basis of aggregated patient and colleague feedback, the small number of doctors who may require further scrutiny without the need to normalise the data or assume the data is normally distributed.

Methods

Setting and design

The design and presentation of questionnaires used in this study were based on instruments developed by the GMC's Revalidation Technical Group. The questionnaires themselves have at their heart core questions addressing the seven domains of "good medical practice", a series of policy statements produced by the GMC outlining and defining key areas of professional performance for doctors. The structure of the two questionnaires is described in Table 1.

⁸ 'Maintaining licensure – ensuring doctors competent and fit to practice in New Zealand', P. Barham and S. Ineson. Available from <http://www.mcnz.org.nz/portals/0/competence/PepPosterabstract%20-%20Sept%202005.pdf>.

¹¹ <http://www.mcnz.org.nz/Competence/PerformanceevaluationprogrammePEP/ResultsandoutcomeofPEP/tabid/1117/Default.aspx>

Cluster analysis for identifying doctors for possible further scrutiny using aggregated patient and colleague data from pilot GMC questionnaires

Abstract¹

Objective To identify statistical methods for identifying doctors who may require further scrutiny as part of any revalidation exercise concerning re-licensing and fitness to practice, and to test the reliability of questionnaires currently being piloted by the GMC for assessing the performance of doctors through patient and colleague feedback.

Design Pilot study consisting of issuing separate questionnaires to patients and colleagues of individual doctors, determining the reliability and validity of these questionnaires and aggregating the judgements for a second level assessment of each doctor.

Setting Several practices throughout the UK.

Participants 500+ doctors have been recruited and, while the study is still in progress, the results here are for 83 doctors who had sufficiently complete patient and colleague responses.

Main outcome measures Separation of doctors whose patient and colleague responses on key professional items locate them as possible outliers in the cohort.

Results Patient and colleague responses indicate great satisfaction with the performance of doctors for the most part. Specific doctors were identified as possible outliers through comparisons of profiles and hierarchical cluster analysis.

Conclusions Cluster analysis provides a useful, additional mechanism for in identifying doctors who may require further scrutiny. GMC patient and colleague questionnaires can be used as one component of performance assessment.²

¹ *** Authors, and order, to be discussed ***

² *** Acknowledgement of GMC contract and support required here. ***

Cluster analysis to find structure in data

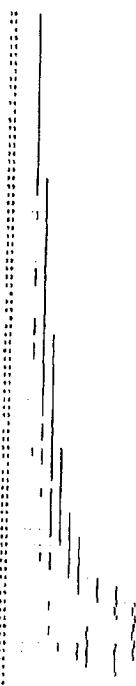
The term cluster analysis (first used by Tryon in 1939!) encompasses a number of different algorithms and methods for grouping objects of similar kind into respective categories.

A general question facing researchers is how to organize observed data into meaningful structures, that is, to develop taxonomies.

Cluster analysis is an exploratory data analysis tool which aims at sorting different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise.

Cluster analysis can be used to discover structures in data without providing an explanation/interpretation. In other words, cluster analysis simply discovers structures in data without explaining why they exist.

11



The tree reveals two major clusters: Doctors 49, 59, 39, 80, 33, 25, 73 and 48 (bottom of diagram), and the rest. Doctor 49 with 20 below-average assessments and seven bottom performances is the 'worst performer' relative to all other doctors in the cohort. The cluster diagram also identifies doctors 59 (16 below average, 5 bottom), 39 (18,2), 80 (20,1), 33 (20,1), 25 (19,0), 73 (11,1) and 48 (16, 0) as falling in a separate cluster from all other doctors. At the other end of the clustering, doctor 38 was above average on 20 items and came top (or equal top) on six others. Doctors 44 (19, 4), 4 (20,3), 65 (19,7) and 15 (19,4), and all the other doctors down to Doctor 32 (16, 4) also performed well in comparison to the cohort, although the number of below average performances increases as we move down that cluster.

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Understanding the colleague data

CQ

		Statistics													
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
N	Valid	2603	2440	2511	2305	2163	2295	2484	2440	2206	2034	2063	2644	2462	2705
	Missing	160	323	252	458	600	468	279	323	557	729	710	119	301	58
Mean		4.80	4.73	4.69	4.67	4.66	4.59	4.61	4.73	4.58	4.62	4.50	4.83	4.89	4.60
Std. Error of Mean		.009	.010	.011	.011	.012	.013	.013	.010	.013	.013	.015	.008	.011	.013
Median		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Mode		5	5	5	5	5	5	5	5	5	5	5	5	5	5
Std. Deviation		.450	.498	.545	.541	.542	.619	.628	.505	.608	.586	.666	.422	.542	.660
Variance		.203	.248	.297	.293	.294	.383	.394	.255	.370	.343	.444	.178	.295	.444
Skewness		-2.147	-1.718	-1.730	-1.524	-1.462	-1.405	-1.757	-1.777	-1.284	-1.387	-1.220	-2.524	-1.673	-1.805
Std. Error of Skewness		.048	.050	.049	.051	.053	.051	.049	.050	.052	.054	.054	.048	.049	.047
Kurtosis		4.098	2.863	2.965	2.340	2.078	1.622	3.877	2.988	1.218	1.344	1.362	6.097	2.368	3.752
Std. Error of Kurtosis		.096	.099	.098	.102	.105	.102	.098	.099	.104	.108	.108	.095	.099	.094
Range		3	4	4	4	4	4	4	3	3	3	4	3	3	4
Minimum		2	1	1	1	1	1	1	2	2	2	1	2	2	1
Maximum		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Skewness: A measure of the asymmetry of a distribution. The normal distribution is symmetric, and has a skewness value of zero. A distribution with a significant positive skewness has a long right tail. A distribution with a significant negative skewness has a long left tail. As a rough guide, a skewness value more than twice its standard error is taken to indicate a departure from symmetry.

Kurtosis: A measure of the extent to which observations cluster around a central point. For a normal distribution, the value of the kurtosis statistic is 0. Positive kurtosis indicates that the observations cluster more and have longer tails than those in the normal distribution and negative kurtosis indicates the observations cluster less and have shorter tails.

Reliability of questionnaires?

- Cronbach's Alpha is a statistic that is used to estimate the reliability of a test
- Cronbach's alpha assesses the reliability of a rating summarizing a group of test or survey answers which measure some underlying factor (e.g., some attribute of the test-taker). A score is computed from each test item and the overall rating, called a 'scale' is defined by the sum of these scores over all the test items. Then reliability is defined to be the square of the correlation between the measured scale and the underlying factor the scale was supposed to measure.
- Varies from 0.0 to 1.0, with scores of 0.8 and above indicating strong reliability of the questionnaires

‘Classical’ data driven methodology

- start with the data and understand it
- try out different statistical methods to see which one or more produces ‘interesting’ results
- may need to reduce the number of variables using some a priori assumptions as to which are most relevant (‘feature selection’)
- identify models that ‘fit the data’
- may need to use cross-validation techniques (leaving out some samples for testing the generalisability of the model)
- often called ‘reverse engineering’
- analyse model to derive hypotheses for classical, hypothesis-driven research

3

GMC Questionnaires

Patient and Colleague Questionnaires – Questionnaire Structure		
Core domains	FQ Number of items	CQ Number of items
Introduction/explanation	4	+
Reason for attendance	2	-
Core questions on professionalism	3	14
Global assessments	3	4
Previous experience of this doctor	1	-
Demographics/ethnicity	3	3
Free text	+	+
Professional role and frequency of contact with indexed doctor	-	2
Total	16	26



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The Master's programme involves two units of study: Research Methods followed by a full Project. The full assessment plan for the Master's program can be found in Workbook 1 of the workbook pack – you must ensure that you are familiar with this plan which essentially describes 3 assessment artifacts – 1a, 1b, 2 and 3.

ASSESSMENT 1a. PJ.NCC – PROJECT SPECIFICATION

The specification developed in this part of the course is regarded as part of the Project Unit and allows you to gain a maximum of 10% of your final project mark before the project begins. In addition, no student will be allowed to start the project until a specification is approved by the University. This specification is developed during the Research Methods unit and is carried out in two stages as described below.

Formatting Requirements - Formatting (if you depart from the spirit of these formatting instructions your work will NOT be marked)

File name is just your HEMIS No with contents as a single MS .doc document using A4 pages.

The font is to be Arial Narrow at 12 pt with 10 pt in diagrams and tables at 6 lines per inch.

The margins to be 2 cm - top, bottom, left and right.

Page header: 'Assessment 1a', Student Name, HEMIS No and Course name'

Page footer: page number in the form Page 1 of 5, 2 of 5 etc and your email address.

Penalties - Any penalty for exceeding the page limit for this work will be decided by the Research Methods tutor. Typically, there will one mark deducted for each page over the limit.

Restrictions - The appendix contains a list of project ideas. Normally, project ideas in the following areas may not be accepted: eBanking, eCommerce, mCommerce, eLearning, Web Site Strategies, Outsourcing, wireless technology and systems, PDA and mobility, simple HCI, Music Distribution or simple security. If you feel that you have a novel or new view on any of the above with a hint of originality then you should approach the Research Methods lecturer to seek his opinion before attempting to write a submission.

Students are reminded that the project must be new work and students are NOT permitted to use any project material that may have been used before on another course or for another purpose. If it is discovered that research material is being re-used it will result in immediate disciplinary action.

STAGE 1. GAINING TITLE/IDEA APPROVAL

There are two parts to this stage:

Personal Profile - You must immediately send your personal profile to the Research Methods lecturer in a WebCT email message (not an attachment). It should be no more than 200 words and must contain:

1. Your current job title,
2. Your company name and location (country where you work)
3. A description of the core work you do
4. A description of your special area of expertise
5. Your Strategic Business IT area or areas of interest relevant to MSc project selection

If you are unemployed then say what expertise you have in whatever area in place of a job description. The Research Methods lecturer will use this information to guide you when he receives your title submission. The profile may also be made available to the University panel that approved your final specification. Please note that no work will be reviewed until your profile is recorded in the records database by the Research Methods lecturer.

ASK for the project to Review & Keep a copy.

- b **Title Submission** - As soon as possible, select a title from the appendix of this document or find one of your own. To gain approval for that title from the Research Methods lecturer write a brief project outline in the format described below embedded in a WebCT email message (not an attachment). Approval may be gained at any time up to one week before the assessment 1a submission date and is worth up to 5% of the marks for Research Methods Unit (Assessment 2).

The topic MUST have an outcome that is in some way having a strategic outcome for it to be acceptable. Strategy in this sense means or implies a long term plan to gain the expected business value. Now the actual outcome may be expressed in all sorts of ways but it must have some relation to Strategic Business IT. Examples:

forms work procedure
it could be a policy framework dealing with IT security issues,
it could be a survey of some aspect of computer help desks that might improve the service
it could be a report on the effectiveness of a software tool and so on.

The whole idea is that the outcome from your project has some impact on the IT infrastructure itself or its use.

Title Approval Submission Format

(500 words)

The submission must not exceed 700 words using the 9 headings shown below. When constructing a submission you MUST expect to go backwards and forward over all the headings and carefully study all the relevant workbook sections. In assessing the submission the tutor will firstly look for consistency between all the headings (unfortunately, some students seem to take the view that each of the headings is a new question and therefore they need not ensure that as a whole the submission make sense). Secondly, that there is a clear strategic Business IT dimension. And lastly, the Basic Activity for Generating Data is clear and practical and leads to the data specification and Research Method.

1. **Title** - Construct a clear title in not more than 100 characters. Use Workbook 6 and the section on writing a title to help you do this.

2. **Topic Outline** - Give a short overview of your chosen topic area. Worksheet 1 of Workbook 5 may help you to prepare this section (not more than 100 words). Please remember, this is NOT a description of what you are going to do, it is a description of the topic area.

3. **Problem to Solve** - say what single significant IT or IT related problem you are trying to solve. (not more the 100 words)

4. **Theory** - try to say what your personal theory is about the situation that has led you to seek a particular solution to the problem you identified above. Use Workbook 6 and the section on theory to be certain you know what is expected here. (not more than 100 words)

5. **Research Question** - write a clear statement of the question you want to ask as a way of encapsulating the quest to resolve your problem theme. Use Workbook 6 and the section on writing a Research Question and the many examples there to help you do this. (not more than one sentence)

6. **Expected Form of Answer and its Strategic IT value** - be clear what form of answer you are expecting from your Research Question and that the form can actually be constructed from your primary data. Use Workbook 6 and the section on writing a Research Question paying particular attention to the examples given there on both question formulation and form of answer. Finally, try to show that obtaining an answer to your research question in the form that you have described will have a strategic business IT outcome that will be valued by business. You should not the form of answer you define here will be your MSc Project outcome in the project unit. (not more than 100 words)

↓

7. Basic Activity for Generating Data – what single key action will you take as a way of getting the data that you will need to answer your Research Question? This is a key section and you are advised to study all the examples in Workbook 6 so that you are confident you know what is expected here. If you are not clear here the whole specification and project will fail. (not more than 50 words).

8. List of Primary Data Items – give a selection of data that you will be looking for but it must be obvious that it is primary data and it could be used to generate the form of answer you expect and arises naturally out of your Basic Activity for Generating Data. Every project must be based on the collection, presentation and processing of primary data. Primary data means data that is original to you and did not exist as a collection before YOU collected it. You may in support of your work also use secondary data sources. (about 50 words).

9. Research Method - Give a brief outline plan and rationale of how you will locate and collect the data that you specified above using one of the methods outline in Workbook 7 (case studies, action research etc) to guide you in this. The method has to be practical, credible and suited to what it is you are doing. (not more than 100 words).

STAGE 2. WRITING THE SPECIFICATION

Once you have an approved title you are allowed to construct a full specification which you will later use to complete assessment 1b which is the final MSc full project. The submission date and drop box for the specification will be published by the Account Manager in the course schedule which may be found in WebCT under General Information and Forms. Your specification will be marked by the Research Methods lecturer and reviewed by a University committee for final approval. The complete specification is worth up to 10% of your Project marks in assessment 1b. If your specification is not approved by the University you will have another opportunity to try again in the next available cohort either with the same title or with a new title.

Specification Format

The specification must be written using the study style heading format shown in workbook 3. The specification must not exceed 6 A4 pages using the formatting rules stated earlier in the document.

Workbook 3 gives you detailed notes on what a project specification must contain and then offers you a worked example for guidance. You must expend considerable effort on researching the topic area as well as the selected Research Method and then reading and carefully studying the notes and workbooks. There is no short cut here and the standards are high and will never be compromised.

You are advised that the tutor is not permitted to read your specification before submission as it must be seen as entirely your own work since it is a formal assessment. However, the tutor will be happy to accept specific questions about any aspect of the specification construction.

Note.

There work done in this specification may be carried over into assessment 2 which covers a similar area but with some new sections. The expectation is that based on the feedback you get from assessment 1a you will be able to improve on many areas found in the specification and repeated in Assessment 2.

Appendix. Project Topic Ideas

Some ideas for final Projects and for use in this assessment – you don't have to select one of these they are just to give you a flavour of what you might look at. The list below was written as general ideas but they could always be applied to a particular situation as well.

No two students will be allowed to use exactly the same idea so it is important for you to get started before all the good ideas are selected and allocated.

1. The effect on Profitability of implementing an IT supported Asset management system
2. The effect of IT systems on company Policy
3. The effect of company Policy on IT procurement
4. How company policy drives IT system selection
5. High Quality IT systems increases worker commitment
6. Highly Integrated systems such as SAP increases worker commitment
7. Highly Integrated systems such as SAP increases worker stress
8. Reliance on private computer systems increases the costs of worker stress
9. How IT can help with Life Cycle logistics in asset Management systems
10. Life Cycle logistics in IT systems
11. How important is user acceptance in the utility associated with IT systems
12. Company policy on IT training affects user acceptance of IT system
13. The impact on worker productivity/morale of removing all personal systems
14. IT Project Management Practice could be improved by the Use of Emotional Intelligence
15. Configuration Management Software and large scale IT installations
16. System Development Life Cycles and their Role in project management Methodologies
17. The impact of Internet enabled systems on resource usage
18. Assess and justify the rational use of the ILS techniques on future IT projects
19. IT outcomes that may prove useful in justification of application of ILS
20. Appraise and judge problems that may be encountered in application of ILS
21. Recommend a corporate strategy with ILS as a core profit center
22. Cost-benefit analysis justifying resource application to achieve IT supportability objectives
23. How ILS is applied to IT acquisition programs and their relation to outside influences
24. Appraise and predict the consequences of inappropriate application of IT Systems
25. Research and define contemporary approaches for applying ILS during the acquisition IT
26. Techniques for costing IT support requirements
27. Possible cost-based processes as critical management tools with regard to IT
28. Analyse, plan, evaluate or report on an IT Project
29. Define the role of ILS in a commercial sector IT procurement programmes
30. Explain the implications of ILS usage in IT installations
31. Report on commercial applications of ILS techniques or philosophies
32. Report on capital investment in an ILS capability for a large corporate IT user
33. IT and Logistics Management
34. IT ethics and the economy/business
35. Technology & Warfare Strategies
36. eAuction - The Future of Procurement?
37. Teleworking and IT professionals
38. Mobile Business & Mobile Commerce
39. Mobile Internet Services – A business Tool
40. Enterprise permeability and the supply chain
41. Strategic role of IT in drug retailing in the Philippines/China etc
42. Impact of IT on international supply chain management
43. The impact of IT on global manufacturers
44. Mobile Communication Devices as a business tool
45. Internet and professional football/cricket/ etc
46. Highly integrated mobile computers system an their Impact on business Users
47. IT and Technology in Sport
48. Forensic IT
49. A business evaluation of Oracle
50. Telemedicine

51. Knowledge Management and its place IT planning/procurement/success etc
52. Web Services – The future for distributed systems (.NET and J2EE etc)
53. Computing Industry standards and their impact on business
54. Software Implementation strategies and their importance to business success
55. Software Maintenance – A company wide strategy for business support
56. Software risk management and its implication for IT strategies
57. IS needs must be matched to value in that IS systems can only be successful if there is a causal link to business success.
58. The impact of IT on financial service provision has been significant.
59. Micro-payment systems – the route to a cashless Society
60. Modern HRM systems have had a major impact on recruitment and retention of staff in large organizations.
61. Attempting to integrate all systems in a company is unwise (4)
62. Modern developments in integrated storage management (3) 1,5
63. Data life cycle management
64. The role of IT training in ensuring personal productivity
65. How new technologies related to location commerce might affect business policies
66. Leisure and simulation software and its possible role in training and development
67. Software Agent technology and its future role in mobile computing
68. Software agent technology and its role in improving search engine performance by profiling usage.
69. Software Agent Technology and its use in improving web applications
70. eMail - a Business Nightmare
71. Dealing with email enquires in large corporations
72. The role of eMail in a modern business Organization
73. eMail and ISPs
74. eMail and the personal user
75. eMail storage Systems and their impact on business
76. eMail currency and its impact on personal productivity
77. The impact of Spam on personal productivity
78. Then effects on business of organizations such as SPEWS in limiting SPAM
79. SPF (Sender Policy Framework) A Answer to SPAM
80. Phishing – a personal tragedy and a corporate nightmare?
81. VoIP and its effects on IT infrastructures
82. Skype and its use as a viable business communication tool
83. IT – How does it add Value to a business
84. The impact of the SPEWS protocols on dealing with unsolicited mail
85. Electronic Voting for Company Use
86. Content Management systems and their place in a Modern Organization (1) (1)
87. Software Failures are Management Failures?
88. Software Quality Assurance in Modern Development Environments and impact on Business
89. IT and Business Risk
90. IT hardware – A never ending Cost Centre
91. Storage Area Networks and their Impact on Business Policy (4)
92. Modern Societies Dependence on Electronic Storage
93. The Paperless Society – an impossible dream?
94. Document Management Strategies (2) (1)
95. Outsourcing Document Management (3)
96. Making better IT Investment Decisions (2) (2)
97. Strategic Issues in Document and Information Management
98. Developing a corporate Strategy for Document and Information Management
99. Document Management and support for Critical Business processes
100. Electronic Documents and Record Management (2)
101. The requirements gathering process is a major cause of project Management Failures
102. The role of IT as a strategic Business Resource
103. The Role of personal desktop applications in worker productivity – applications may include Word, photoshop etc)
104. IT/Computing standardization of systems and the impact on business success
105. IT/Computing standardization of systems and the impact on business policy
106. IT Infrastructure and Business Continuity Planning
107. Business Continuity Planning – A Replacement for IT Disaster Recover
108. The Role of IT Certification in Systems Operational Performance

109. The Role of IT Certification in terms of Strategic IT Development
110. The Role of IT Certification in Implementation Strategies
111. Electronic Document Management Systems and Business Success
112. IT Service Management and Business Success
113. IT Security Management and its Impact on Business success
114. IT Service Levels Agreement and Business Strategies
115. IT training issues and the disabled workforce
116. IT Collaboration Tools and Business Success (email, Intranets, shared files systems, desktops, user profiles etc)
117. Teleworkers and their Impact on IT security, business success, outsourcing etc.
118. IT Application and Organisational Change
119. The role of user training in Requirements gathering
120. The role of prototyping and user involvement in requirement gathering and proving
121. The role of emotional intelligence in IT user support
122. Implementation and training for BizTalk or Sharepoint Portal Server or Content Management Server etc
123. The role of BizTalk or Sharepoint Portal Server or Content Management Server in business success
124. Quality in IT services
125. SAN and Continuous Data Protection
126. Entry level SAN and the SMB/SME
127. Legacy Data and BI Tools sets
128. Leveraging Data and BI tools sets
129. RFID in a retailing Context
130. The Extended Enterprise (networks of suppliers, eProcurement etc)
131. Search Engines and business Efficiency
132. The IP enabled Economy
133. Optimisation of IT services (eg HP OpenView)
134. Hackers – Looking for fortune not fame
135. The adaptive Enterprise (that is growing IT as it is needed)
136. Migration Practices for Legacy Systems and Business Planning
137. IT Strategies and External Business Factors
138. Low cost search Engine optimisation and its business benefits
139. eGov in the Middle East
140. eBooks and Readers – their use by business
141. The Copper Conundrum – Twisted Pair products for 10G Ethernet
142. Performance and Power – GRID Computing (can the power available lead to increased business performance)
143. Anti-spyware – a business and personal necessity
144. Cyber spying
145. IP based surveillance systems
146. Forensic Tools (eg Windows Washer, Privacy Suite etc)
147. Anti-forensic tools (eg Evidence Eliminator)
148. The Insider- Fighting the Enemy within
149. Enabling the small business network
150. Comprehensive Vulnerability Management
151. Secure ID Applications
152. Protecting the desktop
153. Beware of online risks – enterprise users engage on riskier online behaviour than home users
154. EPS (End Point security)
155. Cyberslacking and corporate performance/losses
156. Data: Lost, stolen or strayed (off site backup storage for tapes etc)
157. Software Portfolio Management – The Proving Model
158. Maturity in process Model for Project Management
159. Ensuring the IT project Deliver Business Results
160. Technical and Organisational Transformations
161. Improving the Application of Risk Management
162. The next wave – Computer Systems that never Fail
163. The next wave – computers that think like humans
164. Scandal, Security and Strategy
165. Password Overload and Business Security

166. Storage Security
167. Illegal Downloads and business risk/costs/integrity...
168. Keyboards and their Impact on system productivity
169. Voice activated input system and their efficiency in business situations (such as Via Voice)
170. Cyber Café – A world of Business
171. The characteristics of a Modern IT manager
172. The changing role of the IT professional
173. The strategic Role of IT in business is Questionable
174. Flexible Working in IT – A way Forward
175. IT and Business Risk – Using IT Governance ITIL to minimise business risk
176. Compliance – an IT nightmare
177. Gaining the business edge with IT
178. IS Management in the SME/large corporation/government etc
179. Electronic bill presentment and payment
180. Critical Incident Management in IT
181. The Ethical Hack – A framework for business Value penetration attacks
182. Outsourcing Software Development Offshore
183. Designing Usable Electronic Text
184. Software Testing and Continuous Quality Improvement
185. Lightweight Enterprise Architectures - a way forward in cost control
186. The Role of Ethics in Systems Analysis
187. The effect of Ethical decision-making in the implementation of a Business Information System.
188. The role of Learned Societies (eg BCS) in ensuring professional Competence
189. IT and its role in Social Inclusion
190. Modern Software Development and its role is helping the disabled IT professionals
191. Screen reading Software Efficacy as a solution to enable the visually impaired to use business software
192. Speech recognition system increases widen participation rates/increase worker productivity/ etc
193. The role of Web Content Accessibility Guidelines in moving web sites into the modern era (see www.w3.org)
194. IT professionalism is essential for the full development of the industry
195. ILM (Information Life Cycle) – Controlling the Data Mountain
196. Business Costs associated with Sarbanes Oxley compliance
197. Business Advantages of Sarbanes Oxley compliance
198. Strategies for Sarbanes Oxley compliance Implementations
199. IT and Micro loans in Developing Countries (Gramēen Bank and such things)
200. Micro Payments a route to a cashless society
201. Blogging – A possible business Strategy
202. Blog Monitoring – A possible business Strategy?
203. Blogging – Is gagging bad for business
204. Domain name crime
205. Who owns the Internet – A big Company Takeover
206. Replacement of names and Passwords – What are the security and Usability Implications
207. New Security threats – rootkits
208. Multi-tasking OS a user boon or nightmare?
209. Web Based operating system – Is there a future?
210. Ultra Wide Broadband – and its impact on business
211. High Speed Broadband – it business impact
212. High Speed Brand and User services
213. Security – the users is his own worst enemy
214. Usability and its trade off with security
215. PDA Revival – Is there a Business Future?
216. Portable PCs and their business future (ie blackDog)
217. Security Software Interfaces and personal freedoms
218. Avatars – a way forward for websites?
219. Faces as passwords – a secure business alternative
220. Personal gadgets and Illegal Downloads – The curse of Organisations (iPod etc)

221. Management and IT Potential
222. Managing a business in and IT dominated world
223. IT reporting functions and Business Instinct
224. Managing IT system Integration
225. Managing business Continuity planning with highly integrated systems
226. Security Violation Reporting – How Management Deals with This huge Volume of Data
227. Business implications of the Web Bases OS
228. Microsoft Dynamics – A challenge to SAP and Oracle
229. Community Technology Previews – A Marketing Strategy or a genuine attempt to communicate
230. Adjacent Software – Securing Productivity for the User
231. Web 2 a new model of usage
232. Web based desktop tools and their use in business
233. Results oriented approach to the UI (instead of command-oriented – see 2006 MS office 12)
234. Small Business Accounting Software
235. Cyber-terrorism
236. Sourcing New Technology for enhancing business success
237. Optimising business functions by sourcing new technology

Appendix. A selection of Projects Ideas Approved in past Cohorts

Building a successful software industry in the Caribbean using Free, Libré and Open Source (FLOS) software Business and IT Alignment

Company policy on IT training affects user acceptance of IT system.

Desktop Security Threats and its Business Impact

Dispatching Engine And Mobile Communication Devices To Automate Service Delivery To Customer

eAuction- The Future of Procurement?

email in a modern business organization

Email: Business Boon or business nightmare

Family Life and the Internet : Staying in charge of your life

Improving system performance

Information Technology Security Awareness Programs – A Marketing perspective.

Is the desktop dead? The future of the PC in a mobile world

IT and the changing model of grocery retailing in Malaysia.

IT applications and organizational change

IT Disaster Recovery and Continuity Strategies in The Insurance Industry

IT in Manufacturing

IT in the development of a marketing strategy for a retailing SME

IT Outsourcing lead to better competitive capability for business in Hong Kong

IT Outsourcing: An Incomplete Contracting Perspective

IT Support Operations and Emotional Intelligence

IT supported CRM systems increase the efficiency of Organizations

IT training enhances employees' effectiveness & efficiency

Mobile communication devices as a business tool in the Construction Management Industry.

Mobile Communication Devices Enhance Efficiency of IT Support in a Global IT Infrastructure Environment

Modern developments in integrated security data storage management

Network Operations Centre - A Strategic Fit for T&T Government?

Online procurement lowers operating cost

Project Management is a pre-requisite for all company-wide IT system development activity

Requirements Gathering in Public Service in a developing Countries Contribute to project failure.

Software Quality Assurance - Software Configuration Management

Storage Area Networks within Small to Medium sized businesses (SMB's)

Strategic Storage: Continuous data protection

Teleworking and IT Professionals

The effectiveness of the Intranet to control the flow of data within an organization

The Human Computer Interface - Appropriate Graphical Components for an Intuitive and Proximal Interface

The impact of deploying a wireless network in the company

The impact of IT on the food and catering industry in China

The impact of IT on the Ministry of Sport and Youth Affairs in Trinidad and Tobago

The impact of IT on the Small-Medium Enterprises (SMEs) in Hong Kong

The implementation of enterprise software solutions in Multinational Companies.

The Paperless Society – an impossible dream?

The role and opportunities of Information Industry in Hong Kong competitiveness

Titles of Top Selling
Amazon Books

the Automation issues and the government

The role of IT as a strategic business resource – Intranet collaboration Technologies for modern organization in Malaysia
The role of IT training is ensuring personal productivity
The Strategic role of IT in Agriculture.
The Strategic role of IT in the Trinidad call centre industry
Web Technology and Multi-lingual Real Estate Management
Wireless Technology Issues & guide To An Effective Network implementation

Research Methods: Assessment No. 1a – Project Specification and Outline Literature Review**Introduction**

The full assessment plan for the Master's programme can be found in Workbook 1 of the workbook pack – you must ensure that you are familiar with it as the work here is only part of the overall plan. In this assessment you develop a project specification which is to be approved by a University panel.

Overall Research Methods Marking

You are reminded that this work is weighted and to assess whether you have passed the unit as a whole it will be combined with the statistics assessment in the ratio of $0.7 * \text{Assessment 1a} + 0.3 * \text{Assessment 2}$ where all assessment marks are expressed as a percentage. The overall pass mark is 40%.

Project Focus

The project you write later in the course must be based on the specification you produce here. The project must be coherent with the programme title, therefore, it must be

Research Based – means that you have to collect original data (called primary data) yourself. Primary data is not something you can get out of a book or just download from the Internet – it has to be totally original.

Strategic Business IT Orientation – the primary data you collect has to be used to generate a Strategic Business IT outcome of some kind.

IT learning – the project must represent significant learning potential in the IT/computing field for you.

Project Style – for this degree only the project style known as "Study" is allowed.

New Work - students are reminded that the project must be new work and you are NOT permitted to use any project material or data that may have been used before on another course or indeed for any another purpose. If it is discovered that previous project work or research material is being re-used it will result in immediate disciplinary action.

Restrictions

Project ideas in the following areas are unlikely to be accepted: [eBanking, eCommerce, mCommerce, eLearning, IT-in Education, Web Site Strategies, Outsourcing, wireless technology and systems, PDA and mobility, simple HCI, Music Distribution, VoIP, HelpDesks, CRM factors, or simple security.]

If you feel that you have a novel or new view on any of the above with a hint of originality within a Strategic Business IT framework then you should write to the Research Methods tutor outlining your new idea.

Work Schedule

Assessment 1a is made up of 3 parts. Some of the parts represent progress marks and others for the final work submitted for this part of the Research Methods Unit. To be successful, commitment, care and dedication to delivering your best possible work is needed. Therefore in summary

Part 1. Gaining title approval during the first few weeks of the course is worth up to 10 marks.

Part 2. Passing the online tests, one of which is set each week for 5 weeks is worth up to 5 marks.

Part 3. A short Literature Review and your MSc project specification is worth up to 85 marks.

Note.

Assessment 2 is for statistics and is NOT covered in this description and will be sent separately to you by the mathematics tutor.

Purpose

The purpose of this part of the work is to gain approval for a project idea from the University by writing short MSc project proposal. This is assessed work so you will only be allowed one attempt to gain the full range of marks. If for whatever reason your idea is rejected you may make another attempt but in such a case the maximum mark you can attain for this work is 4 out of the available 10.

Topic Area Selection

Select a title or an idea from Appendix C of this document or find one of your own and use it as the basis for writing a project proposal - there is an example in appendix A to this document.

Study References

The following Workbook and section references are to the Student Workbook Pack Release 2.8. If it is obvious by the quality of your submission that you have not studied this material with care the proposal will be rejected without comment.

Encouragement

You **MUST** expect to go backwards and forwards many times over all the headings until you have a concise, coherent and lucid proposal that is your very best work.

Submission

When your proposal is ready use WebCT email to send it to the Research Methods tutor in a text only (no formatting, no diagrams, no tables etc) message or as an attachment. You are advised to get title approval as early as possible but the tutor will not entertain ANY submission until the beginning of the third week of the unit and no two students will be allowed to use exactly the same topic.

Format and Word Limit

Write the proposal using the headings shown below but you must not exceed 450 words (including the headings). If the word limit is exceeded, any headings are missing, any headings are altered, the sequence of headings changed or any headings added the proposal will not be assessed and you will have to do it again. You must stick closely to the headings - for example, under the heading "Problem Definition" we expect to see ONLY a definition, not how you will solve it, topic discussion, a justification for the study, or indeed anything other than a problem definition. If you wander from the theme of each heading you will lose marks.

Project Proposal (Word Count = 450)

1. Title – Construct a title in not more than 100 characters. (workbook 6 section 6.12 will help you do this.)

2. Background – Give an overview of your topic area as background to understand how you identified the problem theme, but please note this section is NOT a description of what you are going to do, it is a description of the topic area.

3. Presenting Problem Definition – define a single significant IT or IT related problem that you are trying to solve. I suggest you be absolutely clear and say something like "The problem is X and my definition is ...". See Workbook 6 section 6.2 and 6.3.

4. Real-World Target – state what the real world benefit or effect there will be if the stated problem can be resolved or partially resolved by using your MSc project outcome. (See Workbook 6 section 6.10.1 and see Workbook 3 Section 3.2 and 3.4.2.)

5. Research Question – write a question you want to ask as a way of encapsulating the quest to resolve your problem theme with your stated target. (Use Workbook 6 sections 6.5, 6.7 and 6.8.)

6. Personal Theory – express concisely your personal theory about a possible resolution of this problem theme. See workbook 6 sections 6.3.

7. Intended Project Outcome – what is the form of your expected project outcome that arises naturally out of your personal theory and constitutes an answer to your Research Question? Use (Workbook 6 sections 6.2, 6.3, 6.5.4 and 6.7.) You should note that project outcome must be an object that can be placed in a document.

8. Strategic IT value – explain how obtaining the project outcome in the form that you have described above will have a strategic business IT benefit or IT related benefit that will be valued by business. (See sample in Workbook 4)

9. Design for Collecting Primary Data – this is the first part of your design to generate the stated project outcome. This part of the design sets out your process for creating a collection of primary data. The core of this process is called a Basic Activity for Generating Data. See (Workbook section 6.6, 6.7 and the study project specification sample and associated notes in workbook 3 sections 3.2.7 and 3.4.2.)

10. Design for Processing Primary Data — this is the second part of your design to generate the stated project outcome. Crucially here, you set out how you will process the collection of primary data in order to generate the stated project outcome. See the study project specification sample and associated notes which can be found in Workbook 3 sections 3.2.7 and 3.4.2.)

Here is a blank list of headings to help you formulate your project proposal.

1. Title –
2. Background –
3. Presenting Problem Definition -
4. Real-World Target –
5. Research Question –
6. Personal Theory –
7. Intended Project Outcome –
8. Strategic IT value –
9. Design for Collecting Primary Data –
10. Design for processing Primary Data –

Part 2. Online Tests – To be taken during the published date periods

Value = Up to 5 Marks

There are 5 on-line tests and these will be made available for a short time periods every week for the 5 weeks starting in week 2. For each test in which you score 60% or better you will receive one mark. To do these tests YOU must find out where they are on the WebCT site and make sure you take note of when the test are available. No exceptions will be made, if you miss any test for any reason you will NOT be able to take it at some other time.

Part 3. Short Literature Review and Project Specification – Due date 15.9.2006

Value = Up to 85 Marks

Purpose

Once you have an approved or permitted project proposal based on part 2 you are allowed to construct a short Literature Review and a full MSc Project Specification which will be marked by the Research Methods tutor and reviewed by a University panel for final approval. If your specification is not approved by the University you will have another opportunity to try again in the next available cohort either with the same title or with a new one.

Study References

The Workbook and section references found in the sample Literature Review and sample project specification are to the Student Workbook Pack Release 2.8 If it is obvious by the quality of your submission that you have not studied this material with care the proposal will be rejected without comment.

Encouragement

You **MUST** expect to go backwards and forwards many times over all this work until you have a concise, coherent and lucid short Literature Review and full MSc Project Specification.

Submission

When your proposal is ready use the correct WebCT Drop Box and send it to the University. Do NOT send it directly to the tutor unless you have difficulty and there is no time to contact the University. If you send it to the Tutor the University system will not be able to detect a submission and your work will be marked as late and capped at 40% or rejected entirely.

You may submit the work any time up to and including the due date. However, it is unwise to submit early as you may then find that subsequent learning makes you want to change what you have written.

Format and Word Limit

The Short Literature Review and MSc Project Specification must not exceed 3,000 words (including the headings) but excluding the reference list and project plan. In the specification if any major headings are missing, any headings are altered, the sequence of headings changed or any headings added the proposal will not be assessed and you will have to do it again. You must stick closely to the specification headings - for example, under the heading "Presenting Problem Definition" we expect to see ONLY a definition, not how you will solve it, topic discussion, a justification for the study, or indeed anything other than a problem definition. If you wander from the theme of each heading you will lose marks.

Checklist

The formatting details are set out in the checklist found in appendix B which must be included with your submission and is a declaration by you that the work is ready to submit.

Part 3: Section 1 - Literature Review worth up to 25 marks

800 - 1,000 w = 2 1/5 pages.

References - see Workbook 4, Workbook 5 especially Section 5.1 and Workbook 9 Section 9.6.5)

Process - In order to carry out the project work you must have a fully prepared mind and that preparation is carried out using a thorough Literature Review. However, in this section we only expect a short review so that the University can assesses your commitment, scholarly assets and preparedness for moving to the project phase. It is hard to be precise here but a short review of between about 800 and 1,000 words is normally adequate.

Part 3: Section 2 - MSc Project Specification up to 60 marks

1,500 - 2,000 w = 2 1/5 pages.

References - see Workbook 3 section 3.1, 3.2 and 3.4.2

Process - To write up this work use the study project style headings and format located at the above references. You are advised that the tutor is not permitted to read your specification before submission as it must be seen to be entirely your own work since it is a formal assessment. However, the tutor will be happy to accept specific questions or discuss aspects of your work related to the various research elements and principles. It is hard to be precise here but good specifications are typically about 1,500 to 2,000 words.

Warning - to be able to move to the project supervision stage you MUST achieve a mark of at least 35 in the project specification.

It is therefore possible, that you could pass the Research Methods unit but judged, because of a poor specification, as not ready to be allocated a project supervisor and begin the project itself. If this happens to you will be allowed to just submit the project specification again in the next available cohort but your overall Research Methods result will not be affected.

Appendix A. Sample Approval Submission

This is a sample submission for guidance and you should NOT attempt to try to fit your idea onto it as if it were some sort of template in an attempt to reduce the work you have to do - if the tutor believes you are doing that your work will be rejected

The difficult elements are typically to be absolutely consistent and secondly to find an appropriate BAGeD. By consistency is meant that the whole submission links together and we don't find such things as the project outcome mentioned as X in one place and Y in another or the problem theme starts off as A in under one heading but migrates to B under another. If such inconsistencies are discovered, you will lose marks or be rejected outright.

Project Proposal (Word Count = 412)

1. Title – Phishing – Preventative Measures

2. Background – email is a technology that almost everyone uses in the home, at work or on the move. Traditionally, email is a simple one-to-one or one to many message passing technology but it is now offered with enhancements that include voice, video, chat, file passing and file sharing where suppliers are attempting to present a complete communication environment. Difficulties are often attached to such technologies one of these is identity theft and one way of doing this is known as Phishing.

3. Presenting Problem Definition - Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as a legitimate request. The intention therefore is to fool the recipient of the message into releasing information which can subsequently be used for fraudulent purposes.

4. Real-World Target – Increase the awareness of computer users about the nefarious activity of Phishing and hence help prevent identity theft occurring and therefore reducing cases of fraud.

5. Research Question – How can Phishing be reduced or eliminated by generating awareness in computer users in order to reduce the risk of inadvertently releasing confidential or private information and hence incurring loss.

6. Personal Theory – Phishing is an attempt at fraud and relies on unsuspecting individuals giving away confidential or private information. I believe this can be combated by developing a document outlining available strategies for users who may be unsure what actions to take.

7. Intended Project Outcome – my expected form of outcome will be a set of guidance notes on effective strategies to use (including examples) in the event of a Phishing incident occurring.

8. Strategic IT value – the online guidance notes may go some way to preventing or reducing successful Phishing and this will imply that our company employees are more secure and that should lead to a reduction in risk and possibly higher productivity.

9. Design for Collecting Primary Data – the BAGD will be to look for phishing instances. My process will be to draw up a list of known phishing examples and use that to guide me in searching email logs for identifiable incidents followed up by interviewing selected personnel

10. Design for processing Primary Data – once I have the primary data in the form of a collection of phishing incidents I will classify them into general types and based on each type I will devise an illustration and a strategy to combat it contained in a set of guidance notes.

Appendix B – Submission Check List for Assessment 1a Part 3

This form must be included as an appendix to the submission of part 3 of this assessment and it is intended to show you that you have correctly formatted work and included all that is needed.

If you are unable to tick every box then your work is not ready for submission. If boxes are ticked and it is subsequently found that the relevant element is not present it will be taken as a deliberate attempt by you to falsify the record and the work will be returned to you unmarked and disciplinary action initiated with the work automatically regarded as a fail.

Word Count		The maximum permitted word count is 3,000 excluding project plan and reference list.
	I have written down the word count and it does not exceed the permitted value	
	I have used the correct margins of 2cm top, bottom, right and left	
	The work presented is an A4, MS .doc format document in portrait orientation (project plan may be presented in landscape)	
	I have used Ariel narrow font at 12pt size except in the project plan, reading list and page footer where I have used 10pt.	
	I have used a line spacing of 6 lines/inch	
	The first page uses the assessment heading line shown on the specification sample in workbook 3 section 3.4.2	
	I have used the correct format for a specification as found in workbook 3 section 3.4.2	
	Pages have centred footers in the form - Page 1 of 5 - J.J. Letto HEMIS No. 567543 Submission Date: 2004/05	
	I have not used page headers	
	The submission file is named using only my HEMIS Number (if anything else is added your file will be automatically deleted)	
	I have sent my personal profile to the Research Methods tutor	
	All main text is right and left justified	
	Headings are NOT followed by a blank line	
	Headings are in the same font as the main text but are shown in bold	
	I have used a blank line to separate paragraphs	
	I have not numbered any paragraphs or sections	
	I have looked up and studied ALL the references mentioned in this assessment	
	I have cited other people's work properly using the Harvard APA format	
	I have included all citation sources in my list of references	
	I understand that indented sentences can be used where appropriate but bullets are not to be used	
	I have included a references list of at least 10 literature sources	
	My reference list contains no more than thee books covering Research Methods and Statistics	
	I have only used the citation form (Briggs 1999) for passing references to texts	
	I have included at least 3 sources covering the core topic area of this research	
	In the reference list no more that 20% are internet sources	
	The specification includes a plan to get original data (primary data) and I do not have that data already	
	I have ensured that the primary data collected can be used to generate a Strategic Business IT outcome of some kind.	
	The project has a significant learning potential in the IT/computing field	
	I understand for this degree only the project style known as "Study" is allowed.	
	My Literature Review is not be made up of just quotes and paraphrase but is an evaluative dialogue	
	Plagiarism Declaration - I confirm that the enclosed written work is entirely my own except where explicitly stated otherwise. I further declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I further understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.	

Appendix C. Project Topic Ideas

Some ideas for final Projects and for use in this assessment – you don't have to select one of these they are just to give you a flavour of what you might look at. The list below was written as general ideas but they could always be applied to a particular situation as well.

No two students will be allowed to use exactly the same idea so it is important for you to get started before all the good ideas are selected and allocated.

1. Desktop Lifecycle Management – A new MS Provision
2. The effect on Profitability of implementing an IT supported Asset management system
3. Insuring IT based data assets and certification needs (BS 7799 ISMS)
4. The effect of IT systems on company Policy
5. The effect of company Policy on IT procurement
6. How company policy drives IT system selection
7. High Quality IT systems increases worker commitment
8. Highly Integrated systems such as SAP increases worker commitment
9. Highly Integrated systems such as SAP increases worker stress
10. Reliance on private computer systems increases the costs of worker stress
11. How IT can help with Life Cycle logistics in asset Management systems
12. Life Cycle logistics in IT systems
13. How important is user acceptance in the utility associated with IT systems
14. Company policy on IT training affects user acceptance of IT system
15. The impact on worker productivity/morale of removing all personal systems
16. IT Project Management Practice could be improved by the Use of Emotional Intelligence
17. Configuration Management Software in large scale IT installations
18. The impact of Internet enabled systems on resource usage
19. Assess and justify the rational use of the ILS techniques on future IT projects
20. IT outcomes that may prove useful in justification of application of ILS
21. Recommend a corporate strategy with ILS as a core profit center
22. Cost-benefit analysis justifying resource application to achieve IT supportability objectives
23. How ILS is applied to IT acquisition programs and their relation to outside influences
24. Appraise and predict the consequences of inappropriate application of IT Systems
25. Techniques for costing IT support requirements
26. Possible cost-based processes as critical management tools with regard to IT
27. Analyse, plan, evaluate or report on an IT Project
28. Define the role of ILS in a commercial sector IT procurement programmes
29. Explain the implications of ILS usage in IT installations
30. Report on commercial applications of ILS techniques or philosophies
31. IT and Logistics Management
32. IT ethics and the economy/business
33. eAuction - The Future of Procurement?
34. Teleworking and IT professionals
35. Enterprise permeability and the supply chain
36. Impact of IT on international supply chain management
37. The impact of IT on global manufacturers
38. IT and Technology in Sport
39. Forensic IT
40. Telemedicine
41. Knowledge Management and its place IT planning/procurement/success etc
42. Web Services – The future for distributed systems (.NET and J2EE etc)
43. Computing Industry standards and their impact on business
44. Software Maintenance – A company wide strategy for business support
45. Software risk management and its implication for IT strategies
46. IS needs must be matched to value in that IS systems can only be successful if there is a causal link to business success.
47. The impact of IT on financial service provision has been significant.
48. Micro-payment systems – the route to a cashless Society
49. Modern HRM systems have had a major impact on recruitment and retention of staff in large organizations.
50. Attempting to integrate all systems in a company is unwise

51. Modern developments in integrated storage management
52. The Effect of dual or triple core processors on worker productivity
53. Data life cycle management
54. The role of IT training in ensuring personal productivity
55. How new technologies related to location commerce might affect business policies
56. Software Agent technology and its future role in mobile computing
57. Software agent technology and its role in improving search engine performance by profiling usage.
58. Software Agent Technology and its use in improving web applications
59. eMail - a Business Nightmare
60. Mobile email – Taking a business Lead
61. Dealing with email enquires in large corporations
62. The role of eMail in a modern business Organization
63. eMail and ISPs
64. eMail and the personal user
65. eMail storage Systems and their impact on business
66. eMail currency and its impact on personal productivity
67. The impact of Spam on personal productivity
68. Then effects on business of organizations such as SPEWS in limiting SPAM
69. SPF (Sender Policy Framework) An Answer to SPAM
70. Phishing – a personal tragedy and a corporate nightmare?
71. Skype and its use as a viable business communication suite
72. Content Management systems and their place in a Modern Organization
73. IT and Business Risk
74. IT hardware – A never ending Cost Centre
75. Storage Area Networks and their Impact on Business Policy
76. Modern Societies Dependence on Electronic Storage
77. The Paperless Society – an impossible dream?
78. Document Management Strategies
79. Outsourcing Document Management
80. Making better IT Investment Decisions
81. Strategic Issues in Document and Information Management
82. Developing a corporate Strategy for Document and Information Management
83. Document Management and support for Critical Business processes
84. Electronic Documents and Record Management
85. The requirements gathering process is a major cause of project Management Failures
86. The role of IT as a strategic Business Resource
87. IT/Computing standardization of systems and the impact on business success
88. IT/Computing standardization of systems and the impact on business policy
89. IT Infrastructure and Business Continuity Planning
90. Business Continuity Planning – A Replacement for IT Disaster Recover
91. The Role of IT Certification in Systems Operational Performance
92. The Role of IT Certification in terms of Strategic IT Development
93. The Role of IT Certification in Implementation Strategies
94. IT Service Management and Business Success
95. IT Security Management and its Impact on Business success
96. IT Service Levels Agreement and Business Strategies
97. IT training issues and the disabled workforce
98. IT Collaboration Tools and Business Success (email, Intranets, shared files systems, desktops, user profiles etc)
99. Teleworkers and their Impact on IT security, business success, outsourcing etc.
100. IT Application and Organisational Change
101. The role of user training in Requirements gathering
102. The role of prototyping and user involvement in requirement gathering and proving
103. The role of emotional indigence in IT user support
104. Implementation and training for BizTalk or Sharepoint Portal Server or Content Management Server rtc
105. The role of BizTalk or Sharepoint Portal Server or Content Management Server in business success
106. SAN and Continuous Data Protection
107. Entry level SAN and the SMB/SME

(Project management)

108. Legacy Data and BI Tools sets
109. Leveraging Data and BI tools sets
110. RFID in a retailing Context
111. RFID in Baggage Handling
112. SPAM – An analysis of common content
113. The Extended Enterprise (networks of suppliers, eProcurement etc)
114. Search Engines and business Efficiency
115. The IP enabled Economy
116. Optimisation of IT services (eg HP OpenView)
117. Hackers – Looking for fortune not fame
118. The adaptive Enterprise (that is growing IT as it is needed)
119. Migration Practices for Legacy Systems and Business Planning
120. IT Strategies and External Business Factors
121. eGov in the Middle East
122. eBooks and Readers – their use by business
123. Performance and Power – GRID Computing (can the power available lead to increased business performance)
124. Anti-spyware – a business and personal necessity
125. Cyber spying
126. IP based surveillance systems
127. Forensic Tools (eg Windows Washer, Privacy Suite etc)
128. Anti-forensic tools (eg Evidence Eliminator)
129. The Insider- Fighting the Enemy within
130. Comprehensive IT Vulnerability Management
131. Secure ID Applications
132. Protecting the desktop
133. Beware of online risks – enterprise users engage on riskier online behaviour than home users
134. EPS (End Point security)
135. Cyberslacking and corporate performance/losses
136. Data: Lost, stolen or strayed (off site backup storage for tapes etc)
137. Software Portfolio Management – The Proving Model
138. Service-Oriented Architectures (SOA) – A new breed of Applications
139. Improving Best practice in IT support units
140. Taking a cross-organisational approach to IT
141. IT needs to be at the heart of all business plans
142. Managers Manage but Technology Enables
143. Organisational benefits of security surveillance
144. The Evolution of the Intelligent network and its business impact
145. Ensuring the IT projects Deliver Business Results
146. Improving the Application of IT related Risk Management
147. The next wave – Computer Systems that never Fail
148. The next wave – computers that think like humans
149. The computer gadget market and its impact of Business IT
150. Password Overload and Business Security
151. Storage Security
152. Illegal Downloads and business risk/costs/integrity...
153. Keyboards and their Impact on system productivity
154. Security in Kiosk installations
155. Usage patterns in Kiosk installations
156. Voice activated input system and their efficiency in business situations (such as Via Voice)
157. Cyber Café – A world of Business
158. The characteristics of a Modern IT manager
159. The changing role of the IT professional
160. The strategic Role of IT in business is Questionable
161. Flexible Working in IT – A way Forward
162. Compliance – an IT nightmare
163. Gaining the business edge with IT
164. IS Management in the SME/large corporation/government etc

165. Electronic bill presentment and payment
166. Critical Incident Management in IT
167. The Ethical Hack – A framework for business Value penetration attacks
168. Lightweight Enterprise Architectures - a way forward in cost control
169. The Role of Ethics in Systems Analysis
170. The effect of Ethical decision-making in the implementation of a Business Information System.
171. The role of Learned Societies (eg BCS) in ensuring professional Competence
172. IT and its role in Social Inclusion
173. Modern Software Development and its role is helping the disabled IT professionals
174. Screen reading Software Efficacy as a solution to enable the visually impaired to use business software
175. Speech recognition system increases wider participation rates/increase worker productivity/ etc
176. The role of Web Content Accessibility Guidelines in moving web sites into the modern era
177. IT professionalism is essential for the full development of the industry
178. ILM (Information Life Cycle) – Controlling the Data Mountain
179. Business Costs associated with Sarbanes Oxley compliance
180. Business Advantages of Sarbanes Oxley compliance
181. Strategies for Sarbanes Oxley compliance Implementations
182. IT and Micro loans in Developing Countries (Grameen Bank and such things)
183. Micro Payments a route to a cashless society
184. Blogging – A possible business Strategy
185. Blog Monitoring – A possible business Strategy?
186. Blogging – Is gagging bad for business
187. Domain name crime
188. Who owns the Internet – A big Company Takeover
189. Replacement of names and Passwords – What are the security and Usability Implications
190. Awareness Training on Internet Perils for Company Staff
191. The Organisational Burden of Software Licensing Schemes
192. Vendor Service and Software Licensing
193. Mobile Technology Offers Staff a more satisfying work-life balance
194. Business Skills needs of IT Security Officers in Organisations
195. Web Based operating system – Is there a future?
196. Ultra Wide Broadband – and its impact on business
197. High Speed Broadband – it business impact
198. High Speed Broadband and User services
199. Security – the users is his own worst enemy
200. Usability and its trade off with security
201. PDA Revival – Is there a Business Future?
202. Portable PCs and their business future (ie blackDog)
203. Security Software Interfaces and personal freedoms
204. Personal gadgets and Illegal Downloads – The curse of Organisations (iPod etc)
205. Management and IT Potential
206. Managing a business in and IT dominated world
207. IT reporting functions and Business Instinct
208. Managing IT system Integration
209. Managing business Continuity planning with highly integrated systems
210. Security Violation Reporting – How Management Deals with This huge Volume of Data
211. Business implications of the Web Bases OS
212. Microsoft Dynamics – A challenge to SAP and Oracle
213. Community Technology Previews – A Marketing Strategy or a genuine attempt to communicate
214. Adjacent Software – Securing Productivity for the User
215. Web 2 a new model of usage
216. Web based desktop tools and their use in business
217. Results oriented approach to the UI (instead of command-oriented – see 2006 MS office 12)
218. Small Business Accounting Software
219. Cyber-terrorism
220. Sourcing New Technology for enhancing business success
221. Optimising business functions by sourcing new Information technology

222. Digital Paper – A new Business Tool

223. Microsoft Office Business Scorecard Manager – A modern Management tool

Appendix. A selection of Projects Ideas Approved in past Cohorts

Building a successful software industry in the Caribbean using Free, Libré and Open Source (FLOS) software
Business and IT Alignment

Company policy on IT training affects user acceptance of IT system.

Desktop Security Threats and its Business Impact

Dispatching Engine And Mobile Communication Devices To Automate Service Delivery To Customer

eAuction- The Future of Procurement?

email in a modern business organization

Email: Business Boon or business nightmare

Family Life and the Internet : Staying in charge of your life

Improving system performance

Information Technology Security Awareness Programs – A Marketing perspective.

Is the desktop dead? The future of the PC in a mobile world

IT and the changing model of grocery retailing in Malaysia.

IT applications and organizational change

IT Disaster Recovery and Continuity Strategies in The Insurance Industry

IT in the development of a marketing strategy for a retailing SME

IT Outsourcing lead to better competitive capability for business in Hong Kong

IT Outsourcing: An Incomplete Contracting Perspective

IT Support Operations and Emotional Intelligence

IT supported CRM systems increase the efficiency of Organizations

IT training enhances employees' effectiveness & efficiency

Mobile communication devices as a business tool in the Construction Management Industry.

Mobile Communication Devices Enhance Efficiency of IT Support in a Global IT Infrastructure Environment

Modern developments in integrated security data storage management

Network Operations Centre - A Strategic Fit for T&T Government?

Online procurement lowers operating cost

Project Management is a pre-requisite for all company-wide IT system development activity

Requirements Gathering in Public Service in a developing Countries Contribute to project failure.

Software Quality Assurance - Software Configuration Management

Storage Area Networks within Small to Medium sized businesses (SMB's)

Strategic Storage: Continuous data protection

Teleworking and IT Professionals

The effectiveness of the Intranet to control the flow of data within an organization

The Human Computer Interface - Appropriate Graphical Components for an Intuitive and Proximal Interface

The impact of deploying a wireless network in the company

The impact of IT on the food and catering industry in China

The impact of IT on the Ministry of Sport and Youth Affairs in Trinidad and Tobago

The impact of IT on the Small-Medium Enterprises (SMEs) in Hong Kong

The implementation of enterprise software solutions in Multinational Companies.

The Paperless Society – an impossible dream?

The role and opportunities of Information Industry in Hong Kong competitiveness

The role of IT as a strategic business resource – Intranet collaboration Technologies for modern organization in Malaysia

The role of IT training is ensuring personal productivity

The Strategic role of IT in Agriculture.

The Strategic role of IT in the Trinidad call centre industry

Web Technology and Multi-lingual Real Estate Management

Wireless Technology Issues & guide To An Effective Network implementation

Exercise 002a.01.q – Writing Research Questions

Try to remember that a good Research Question has several features but the most important of which are that it link problem and target and imply an expected form of answer. So ask:

- What problem is stated?
- What target is mentioned?
- Is there a data spotlight (where does the data come from)
- What sort of answer would I give? (a general description, a process description, an explanation, a definition, an exploration, a model etc)

Exercise

Look at the following Research Questions extracted from student work- which all have faults of one sort or another and say what these faults are. Don't shirk this exercise; take a few minutes to sketch out your view on each one, because you might otherwise fall into exactly the same trap.

1. Research Question - How redundant business processes be integrated to boost business performance?

Problem:
Target:
Data Spotlight:
Answer Form:

2. Research Question - What can be done to ensure successful implementation of OSP? ?

Problem:
Target:
Data Spotlight:
Answer Form:

3. Research Question - How can the awareness of the use of IT be used in order to ensure a better future for SMEs?

Problem: IT IMPLEMENTATION
Target: BUSINESS PERFORMANCE FOR SME
Data Spotlight: BUSINESS
Answer Form:

4. Research Question – The project will focus on the conceptual clarity on eTS, followed by basic eTS structure, sample programmes applied on products, and bring out the limitations on eTS. A literature and bibliography will be enclosed for further study.

Problem: IT IMPLEMENTATION
Target: BUSINESS PERFORMECE FOR SME
Data Spotlight: BUSINESS
Answer Form: BUSINESS

5. Research Question - What better strategy will be suitable to protect the organization's businesses from being disrupted by cyber terrorist attacks?

Problem: HACKING
Target: SECURITY
Data Spotlight: USERS
Answer Form: SECURITY MODEL BASED IN HARDWARE

6. Research Question – How can IP telephony system be used to enhance IT operations and procedures in order to improve network operations and potential cost savings?

Problem:
Target:
Data Spotlight:
Answer Form:

Exercise 001c.01.q – Analysing Problem Definitions

Here is an extended example of student work where we have a very poor and much laboured problem definition and to me it exposes the student's obsession with a particular solution. Try to analyse what is written and write a short report to the student explaining what you think is wrong here.

Student Example Problem Definition

The problem theme for computer maintenance staffs is focusing on incompetence at working environment whereby staffs find that it is complicated to handle new problems regarding hardware and software at real-time. Some new problems appeared in all of sudden in the computer system, which this makes most staffs are not capable enough and expertise to solve the new problems immediately that to meet to the requirement of clients at the quality time frame given. Moreover, staffs used to take much time to solve the problems and in terms of that also they kept postponed to the next days and times in very often which these makes most clients get frustrated, lost confident and unsatisfied with their service. In addition, management also faced with low productivity which effect to the organization profit.

Comment

Add your feedback to the student here.

Student Example Theorisation (speculation)

The problem solution from this research is to supply educational technology training for computer maintenance staffs for updating their knowledge about new technology by exposing them in the real-time in handling new problems so that they will be well-versed with the new problems arrived and technology evolved in the current market. When employee updating their knowledge about new technology via educational technology training, they will absorb new skills and technology and become a quality employee which will improve their troubleshooting performance. Moreover they will also expertise to solve any new problems in hardware or software at any kind of scenario. In addition, they will also be producing a high quality of work at a high quality of time, which also will increase the productivity.

Comment

Add your feedback to the student here.

A Possible Formulation

Write some notes here that would help the student arrive at a suitable formulation for a research project using the 4 key headings: **Problem, Target, Theorisation/Speculation and Outcome Form** -

Research Methods: Assessment – Project Specification and Outline Literature Review**Introduction**

In this assessment you develop a short literature review and project specification which is to be approved by a University panel. The overall pass mark is 40%.

Project Focus

The study project you write later in the course must be based on the specification you produce here. The project must be coherent with the programme title, therefore, it must be

Problem-Solving Based – meaning that you have to investigate a real problem, which may be based on the work that you do for your organization, and collect original data (called primary data) yourself. In some cases, data sets may be given to you. You may also select a topic from the list provided in Appendix E.

Strategic Business IT Orientation – the primary data has to be used to generate a Strategic Business IT project outcome of some kind.

IT learning – the project must represent significant learning potential in the IT/computing field for you.

New Work - projects must be new work and you are NOT permitted to use any project material or data that may have been used before by you on another course or indeed for any other purpose. If it is discovered that previous project work or research material is being re-used it will result in immediate disciplinary action.

Schedule of work to be done**Pre-Work 1. Induction Checklist****Due Immediately but cut off date 13.4.2007**

You must complete the induction checklist shown in Appendix A and send it to the Research Methods tutor, Mr Fred Garlick, in a WebCT email. If the checklist is not received by the cut off date your registration may be revoked and fees forfeited.

Pre-Work 2. Personal Profile**Due Immediately but cut off date 13.4.2007**

You must complete a personal profile as shown in Appendix B and send it to the Research Methods tutor, Mr Fred Garlick, in a WebCT email. If the profile is not received by the cut off date your work will not be assessed and you will be recorded as a fail.

Pre-Work 3. Online Tests**Each test must be completed within the date period stated in Webct**

It is recommended that you complete these self tests in the first 5 weeks as they are designed to take you through the notes in a systematic manner. The score you should aim for is to get at least 65%. The marks will not count towards your Research Methods mark but doing the tests will help you in studies and will assure the University assessment panel that you are committed to the course.

Pre-Work 4. Project Approval**Due any time after week 2 but cut off date 27.4.2007**

Purpose - It is necessary to get your project idea approved during the first few weeks of the course, based on a simple written project outline. Failure to gain approval will mean that you cannot attempt the assessment itself.

Topic Area Selection - Appendix E contains a list of topic ideas which show you the range of possibilities for the project. The key point is that you must be able to collect or be given by the University primary data and it must be possible to regard the topic as Strategic Business IT.

Study References - The study references given throughout this assessment are to the Student Workbook Pack CN.002 Release 3.3 which you must download from the WebCT site using the SBIT resources and Information section.

Submission - When your proposal is ready use WebCT email to send it to the Research Methods tutor in a text only (no formatting, no diagrams, no tables etc) message – it must **NOT** be sent as an attachment. You are advised to seek approval as soon as possible but it would be very unwise to try to do it until after the first two formal subject area chat sessions.

Format and Word Limit - Write the proposal using the headings shown below but you must not exceed 400 words (including the headings and declaration). All work is submitted with a declaration and this must be offered honestly. **A fully worked sample can be found in Appendix C.**

Requirements – the expectation is that you will prepare this work thoroughly and only submit your very best work. The tutor is there to help you prepare but will NOT look at multiple drafts until you get it right. You are however, encouraged to discuss with him any difficulties you have at any time.

Project Proposal (Word Count =, Student Number =)

Declaration – <student name> confirm that I have carefully studied all the Workbook references in constructing this proposal and that what is described here is a new work and is not copied from any source.

1. Title – Construct a title in not more than 100 characters. (Study workbook 6 section 6.14).

2. Problem – define a single significant problem for which you are going to find a solution route. Problems are such things as: inaccuracy in data entry, lack of motivation, slow and inaccurate responses to audit requests, inability to maintain competitiveness in a rapidly changing business world, learning difficulties in online courses, vestigial manual processes after the implementation of CRM, data losses in supposedly secure systems and so on. (Study Workbook 6 section 6.2 and 6.11)

3. Real-World Target - these are the effects that will be observable and measurable in the real world if the problem can be solved by using your project outcome in some way. It is permissible to list more than one effect but it is best to look for the principal one. Targets are such things as: efficiency gains, provide or enable better communication, increased accuracy, increased awareness and so on. (Study Workbook 6 section 6.3 and 6.8.5)

4. Project Outcome – this is the object you will generate as the final product of your MSc project. Possible outcomes are characterised by nouns so might be: reports, models, frameworks, policies, strategies, position papers, reviews, procedure descriptions, best practice descriptions, lexicons, dictionaries, concordances, protocols, diagrams, charts, plans, etc. You must define the outcome and show that you really understand what it is as a structure and what it contains as your outcome. For example, if you say that your outcome is a policy then we must be able to see from what you write that you indeed do know what a policy is supposed to be and what it will contain. (Study Workbook 6 section 6.4 and 6.8.5)

5. Actor - It is normal when you define your outcome to say who the actor or actors are (meaning persons) who will use your defined outcome and then show that its use by them leads to the target effects. Actors might be anyone who can use the outcome: departmental managers, computer users, IT migration teams, sales staff, software developers and so on. (Study Workbook 6 section 6.5 and 6.8.5)

6. Research Question – this is a sentence expressed as a clear question that connects the various elements and expresses the direction of your research and summarises your whole project. You should note that there are 6 elements to a good Research Question and they must all be present in whatever you write. (Study Workbook 6 section 6.8)

Here is a set of headings for you to use but make sure you study with care the format as well as the sample that can be found in Appendix C and **all** associated references,

Project Proposal (Word Count =, Student Number =)

Declaration – I <student name> confirm that I have carefully studied all the Workbook references in constructing this proposal and that what is described here is a new work and is not copied from any source.

1. Title –

2. Problem –

3. Real-World Target -

4. Project Outcome –

5. Actor –

6. Research Question –

Purpose – Once you have an approved or permitted project proposal you are allowed to construct a short Literature Review and a full MSc Project Specification which will be marked by the Research Methods tutor and reviewed by a University panel. If your specification does not get at least a 40% pass marks you will have another opportunity to try again in the next available cohort either with the same project title or with a new one.

Encouragement - You **MUST** expect to go backwards and forwards many times over all this work until you have a concise, coherent and lucid short Literature Review and full MSc Project Specification.

Submission - When your assessment attempt is ready, use the correct WebCT Drop Box and send it to the University. Do NOT send it directly to the tutor unless you have difficulty and there is no time to contact the University. If you send it to the Tutor the University system will not be able to detect a submission and your work will be marked as late and capped at 40% or rejected entirely. You may submit the work any time up to and including the due date. However, it is unwise to submit early as you may then find that subsequent learning makes you want to change what you have written.

Format and Word Limit - The Short Literature Review and MSc Project Specification must not exceed 2,500 words (including the headings) but excluding the reference list and project plan covering about 6 pages. In the specification if any major headings are missing, any headings are altered, the sequence of headings changed or any headings added or you have not used the format shown in the Workbook Pack CN.002 Release 3.3 section 3.5.2 the proposal will not be assessed and you will be recorded as a fail.

Weighting – each element is marked out of 100 but to calculate the overall assessment score the short literature review will be weighted at 0.25 and the Specification 0.75

Checklist - The formatting details are set out in the checklist found in appendix D which must be included with your submission and is a declaration by you that the work is ready to submit. A penalty will be applied of 2 marks for every departure found in your work from the requirements found in the checklist.

Requirements – the expectation is that you will prepare this work thoroughly and only submit your very best work. The tutor is there to help you prepare but will NOT look at multiple drafts until you get it right. You are however, encouraged to discuss with him any difficulties you have at any time.

Literature Review worth up to 100 marks

References - see Workbook 4, Workbook 5 especially Section 5.1, 5.6 and 5.7 and Workbook 9 Section 9.7.5.

Process - In order to carry out the project work you must have a fully prepared mind and that preparation is carried out using a thorough Literature Review. However, in this section we only expect a short review so that the University can assesses your commitment, scholarly assets and preparedness for moving to the project phase. It is hard to be precise here but a short review of between about 800 and 1,200 words is normally adequate.

MSc Project Specification up to 100 marks

References - see Workbook 3 section 3.1, 3.3 and 3.5.2

Process – To write up this work use the study project style headings and format located at the above references. You are advised that the tutor is not permitted to read your specification before submission as it must be seen to be entirely your own work since it is a formal assessment but see requirements above. It is hard to be precise here but good specifications are typically about 1,500 to 2,000 words.

You should also complete the Ethical Examination Questionnaire and submit it at the same time as the Short Literature Review and Project Specification but sent directly to the Research Methods tutor. This will not be marked but if it is absent, your specification is incomplete and will not be marked, resulting in a fail for this unit.

Appendix A – Induction Checklist

Welcome 003a.01 - Induction check list		
Full Name:		HEMIS Number:
<p>1. All students, including repeating ones, must complete this checklist by the cut off date and send it to the Research Methods tutor (Mr Garlick). The checklist is to help you make sure you are prepared for the course and to do that the list requires a tick in EVERY box as confirmation that you have done everything that is needed to begin the course. Send it as an email attachment named with just your Student number (do NOT use your NCC number) – if anything else is added the system will automatically reject it and you will have to do it again.</p> <p>2. At the same time as you send in your checklist it is useful to also send your profile as defined in Appendix B.</p>		
1.		I have located the email section of WebCT
2.		I have read CN.002 3.3 Section 2.1 and understand what is required of a personal email account for use on this course
3.		I have created a single personal internet based email address that will be used for the duration of the course
4.		I have set mail forwarding in ALL my WebCT accounts to my personal internet based email account
5.		I have downloaded a copy of HB.001 3.0a Student Handbook
6.		I have located the course information resources section in WebCT
7.		I have downloaded a copy of the Student Web Site Guide
8.		I have downloaded a copy of CN.001 3.2a MSc Research Methods Notes
9.		I have downloaded a copy of CN.002 3.3 Student Workbook Pack
10.		I have downloaded a copy of CN.003 3.2a MSc Statistics Notes
11.		I have downloaded a copy of 2007 03 Assessment - Short Literature Review and Project Specification
12.		I have downloaded a copy of the Research Methods map (electronic form only)
13.		I have downloaded a copy of the Research Methods Project Map (electronic form only)
14.		I have downloaded a copy of the Chat and course schedule and personally diarised all relevant dates and times
15.		I have downloaded a copy of the Normal Probability Tables
16.		I have located a copy of University Academic Regulations
17.		I have located a copy of the ECF Form and Guidelines
18.		I have noted that the Assessment is in several parts and personally diarised the relevant cut off and due dates
19.		I have noted that the Assessment Pre-Work 4 deals with approval based on a Project Proposal.
20.		I note that the tutor will NOT read multiple drafts of assessed work though I may ask questions at any time.
21.		I have located in WebCT the 5 online tests and noted the dates when they will be active for me to take
22.		I have noted that the Assessment contains a short Literature Review, worth up to 100 marks
23.		I have noted that the Assessment contains Project Specification worth up to 100 marks
24.		I have noted that I must complete an Ethical Examination Questionnaire and submit it with the my project Specification
25.		I have located the Drop Boxes for posting the Assessment when it is due
26.		I have made a note of where the chat logs archives are located in WebCT
27.		I have located the chat rooms and entered one of them to ensure that I can gain access when required
28.		I understand that extra chat (for questions, comments and grumbles) will be available almost every week at 1400 Sunday
29.		I have downloaded and installed a copy of StarTreeStudio3 and examined the two maps mentioned above.
30.		I have read section 1 of CN.002 Release 3.3 and noted the overall assessment pattern of the MSc course
31.		I have read section 1 of CN.002 Release 3.3 and noted the assessment pattern for the Research Methods unit
32.		I have read section 2 of CN.002 Release 3.3 and made a study plan for myself (you may be asked for a copy)
33.		I have located the plagiarism declaration in CN.002 Release 3.3 and know I will have to use it in all submitted work
34.		I have located the Discussion Board and posted a greeting to my fellow students in the thread called Café
35.		I understand that I must get and submit a letter of support from the organisation where I intended to collect primary data
36.		I understand that if my project outcome is not based on primary data it will not be accepted
37.		I understand that the project work must be a new and not a modification or extension of something I have done already
38.		I understand that this checklist does not cover the statistics part of this course and I must discover that information
39.		I understand that all work must be completed by the cut of or dues date and no extension will be given.

Appendix B. Personal Profile

This profile must be sent to the Research Methods lecturer (Mr Garlick) via WebCT in text only message of no more than 350 words (including headings). The University will use this information to guide you in project title submission and selection. The profile will be available to the University panel that approves your specification.

Profile (Word Count = ??)

1. **Student No:** This is issued by the University
2. **Full Name:**
3. **Job Title:** Your current job title (or state unemployed),
4. **Company Name:** where you currently work (or write none)
5. **Company Profile:** briefly state the major business of you company (or write none)
6. **Country:** where you currently reside
7. **Job Description:** describe your core work (if unemployed say what work you would like to do)
8. **Years IT Experience:** state the number of years that you have had significant professional IT/Computing experiences
9. **Area of Expertise:** list no more than 3 areas in which you regard yourself as expert.
10. **Formal Academic Qualifications:** list in abbreviated form all your higher level certificated qualifications.
11. **Other Qualifications:** list in abbreviated form other qualification such as MCE
12. **Acceptance Basis:** explain briefly on what basis your PgD College accepted you onto the MSc part of the programme
13. **College Name:** this must be the name of the College where you gained your NCC Strategic Business IT PgD. Please make sure the name is correct.
14. **Academic Project Experience:** briefly describe the last academic project you completed.
15. **Email Address:** the one you expect to use for the duration of the course which must be the same as the forwarding address you set for your various email accounts in WebCT.

Example Profile (Word Count = 178)

1. **Student No:** 903210
2. **Full Name:** James Sheene-Southwood
3. **Job Title:** IT Project Manager
4. **Company Name:** BlueBird Systems Ltd
5. **Company Profile:** bespoke software in ticketing systems
6. **Country:** England
7. **Job Description:** Managing Business Systems Applications Developments including Requirements Gathering, Business Analysis and System Design using Prince2 methodology mainly in the Inventory Management area.
8. **Years IT Experience:** 6 years
9. **Area of Expertise:** Project Management practices but I also have some experience in Web based development and technologies within an IBM AS/400 environment
10. **Formal Academic Qualifications:** BSc (Hon) Computing, PgD SBIT
11. **Other Qualifications:** none
12. **College Name:** Purpletrain.com UK
13. **Acceptance Basis:** my first degree and 5 years computing experience
14. **Academic Project Experience:** Last academic project was a Web based ticketing system for a laundry service. Professionally my most recent work covered Technical Design of a web based invoice processing system for a UK holiday company
15. **Email Address:** james.sheene@googlemail.com

Please remember I don't want a copy of your job specification I just need to feel I concisely and precisely know who you are, what you do and where skills you have.

Appendix C. Sample Project Proposal

This is a sample submission for guidance in preparing your own project proposal. Please remember that you must use the set headings, you must study all the references and it must be your very best work. If you submit work that is very poor or show obvious signs that you have not prepared well or ignored the references the work will be returned without comment and a note made in your student record.

If you are unsure about any aspect or about the topic you will use then discuss it with the tutor before making a submission

Project Proposal (Word Count = 251, Student Number = 999877)

Declaration – I Colleen McCulumb confirm that I have carefully studied all the Workbook references in constructing this proposal and that what is described here is a new work and is not copied from any source.

1. Title – Phishing – Preventative Measures

2. Problem – Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as a legitimate request. The intention therefore is to fool the recipient of the message into releasing information which can subsequently be used for fraudulent purposes.

3. Real-World Target - Increase the awareness and generate competence of computer users in identifying and dealing with the nefarious activity of Phishing and hence help prevent identity theft occurring and therefore reducing cases of fraud.

4. Project Outcome – my expected form of outcome will a protocol to use (including examples) in the event of a Phishing incident occurring. The protocol is essentially a set of careful guidelines for use in governing what to do and how to communicate in various circumstances in the event of an identified Phishing incident.

5. Actor – it is expected that these strategies will be used by individual employees both to inform and guide them in recognising, dealing with and reporting phishing incidents.

6. What (interrogative) action protocol (outcome) can be devised for use by company personnel (actors) who use email operationally to ensure that phishing incidents (problem) can be identified, managed and reported thus ensuring that confidential information is safeguarded (target) by profiling identifiable phishing events (spotlight)?

Appendix D – Submission Check List for Assessment 1 Part 3

This form must be included as an appendix to the Assessment submission of the short literature review and specification and it is intended to show you that you have correctly formatted your work and included all that is needed. If you are unable to tick every box then your work is not ready for submission.

Word Count		The maximum permitted word count is 2,500 excluding project plan and reference list.
1.		I understand that every departure from the check list requirements found in my work will incur an overall 2 mark penalty
2.		I have sent the Ethical Examination Questionnaire as a separate document named with my student number to the tutor.
3.		I have sent a letter of support from the organization where I intend to collect data to the tutor by email (Appendix F)
4.		I have written down the word count and it does not exceed the permitted value
5.		I have include a short literature review as required
6.		I have included a specification as required using the exact format of headings found in CN.002 Release 3.3 section 3.5.2
7.		The first page uses the 3 heading lines shown on the specification sample in CN.002 Release 3.3 section 3.5.2
8.		I have used the correct margins of 2cm top, bottom, right and left
9.		The work presented is a single A4, MS .doc format file using portrait orientation (project plan may be in landscape)
10.		I have not attached an cover/front sheets or contents lists.
11.		I have used Arial narrow font at 12pt size except in the project plan, reading list and page footer where I have used 10pt.
12.		I have used a line spacing of 6 lines/inch
13.		Pages have centred footers in the form – Page 1 of 5 - J.J. Letto HEMIS No. 567543 Submission Date: June 2007
14.		I have not used page headers
15.		All main text is right and left justified
16.		Headings are NOT followed by a blank line
17.		Headings are in the same font as the main text but are shown in bold
18.		I have used a blank line to separate paragraphs
19.		I have not numbered any paragraphs or sections although but the set of objectives is numbered sequentially.
20.		I understand that indented sentences can be used where appropriate but bullets are not to be used
21.		The submission file is named with only my HEMIS No. (if anything else is added your file will be automatically deleted)
22.		I have sent my personal profile to the Research Methods tutor
23.		I have sent my induction checklist to the Research Methods tutor
24.		I have looked up and studied ALL the Workbook references mentioned in this assessment
25.		I have included all citation sources used in my work in my list of references
26.		My short Literature Review is not be made up of just quotes and paraphrase but is an evaluative topic area dialogue
27.		I have cited other people's work properly using the Harvard APA format
28.		I have included a references list of at least 10 literature sources
29.		My reference list contains no more than thee books covering Research Methods and Statistics
30.		I have only used the citation form (Briggs 1999) for passing references to texts
31.		I have included at least 3 sources covering the core topic area of this research
32.		In the reference list no more that 3 are internet based
33.		The specification includes a plan to get original data (primary data) and I do not have that data already
34.		I have ensured that the primary data collected can be used to generate a Strategic Business IT outcome of some kind.
35.		My data processing design will generate the stated outcome and the design is clear enough to be executed by anyone
36.		The project has a significant learning potential in the IT/computing field
37.		Plagiarism Declaration - I confirm that the enclosed written work is entirely my own except where explicitly stated otherwise. I further declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions.

Appendix E. Project Topic Ideas

The following list contain some ideas for Projects – it is not intended that you have to choose one from this list they are just to give you a flavour of what you might look at. The list below was written as general ideas but they could always be applied to a particular situation as well.

The first table below is specially designed for those who are unemployed and on this course it is perhaps a little more difficult to find a project idea for the simple reason you cannot easily get access to primary data. So here are a few ideas that you might find useful.

Community – we all live in communities of one sort or another such as: connected to the Church, the Mosque, various clubs, societies, charities and so on. Now it turns out that often students can find a project idea here if they care to look.

Small Business – it might be possible to look at some aspect of small business operation in you community.

Public Services – it might be possible to get permission to work within support organisations run or sponsored by public services.

Internet Products and Services – there are lots of services now that one can access: Radio stations, TV stations, songs and other recordings, diaries, blogs, information sites, online back up and so on

Project Ideas for the Unemployed or those not working directly in IT	
1	Use of the Internet by the unemployed
2	Home shopping and customer services
3	eMarketing for the small business – A linked retail community
4	Internet use by the Immigrant Community in London – Finding Government Services
5	Internet use for language learning in the Immigrant Community
6	Internet use for the teaching of women in closed communities
7	Internet café style services in local libraries – a business case
8	Security practices in Internet cafes
9	Instant Messaging – Is there an Ideal System for personal use?
10	Front Desk Operations in Battersea Swimming Club
11	Ethical considerations in free web access
12	The use of IT in the care and support of the homeless
13	Kiosk technology in Shopping centres – a retail support tool
14	A business case for web based advertising for the small business
15	A review of email providers for private users
16	A review of sponsored links in personal email services – useful or useless?
17	The ethical underpinning of email sponsored links
18	The business case for sponsored links in email
19	A review of the effectiveness of SPAM control in popular personal email systems
20	Online games and the business case for associated sponsored links
21	Gaming machines and the ethics of constant online updating
22	Business Blogging and Uses
23	TV down load Software and the customer supplier relationship
24	Private Web sites - their role in promotion (such as concerts, clubs, etc
25	Web based Special Interest groups and business ethics
26	Use of web bases desk top tools – boon or menace
27	A review of web based diary systems and their business potential
28	Internet Telephone services and their impact on business communication
29	Automatic Online Backup for the private user – A technological and cost effective Idea

Security	
1	Anti-forensic tools (eg Evidence Eliminator)
2	Anti-spyware – a business and personal necessity
3	Awareness Training on Internet Perils for Company Staff
4	Beware of online risks – enterprise users engage on riskier online behaviour than home users
5	Business Skills needs of IT Security Officers in Organisations
6	Comprehensive IT Vulnerability Management
7	Cyber spying
8	Data: Lost, stolen or strayed (off site backup storage for tapes etc)
9	Domain name crime
10	EPS (End Point security)
11	Forensic IT an Essential Business Resource
12	Forensic Tools (eg Windows Washer, Privacy Suite etc)
13	Hackers – Looking for fortune not fame
14	Illegal Downloads and business risk/costs/integrity...
15	IP based surveillance systems
16	IT Security Management and its Impact on Business success
17	Organisational benefits of security surveillance
18	Password Overload and Business Security
19	Protecting the desktop
20	Replacement of names and Passwords – What are the security and Usability Implications
21	Secure ID Applications
22	Security – the users is his own worst enemy
23	Security in Kiosk installations
24	Security Software Interfaces and personal freedoms
25	Security Violation Reporting – How Management Deals with This huge Volume of Data
26	Storage Security
27	The Ethical Hack – A framework for business Value penetration attacks
28	The Insider- Fighting the Enemy within
29	Usability and its trade off with security
30	Usage patterns in Kiosk installations
31.	RFID tagging (on people or staff in airports, shopping centres etc)

Project Management	
1	Analyse, plan, evaluate or report on an IT Project
2	Computing Industry standards and their impact on business
3	Configuration Management Software in large scale IT installations
4	Define the role of ILS in a commercial sector IT procurement programmes
5	Desktop Lifecycle Management – A new MS Provision
6	Ensuring the IT projects Deliver Business Results
7	Explain the implications of ILS usage in IT installations
8	How important is user acceptance in the utility associated with IT systems
9	How IT can help with Life Cycle logistics in asset Management systems
10	IT and Logistics Management
11	IT Project Management Practice could be improved by the Use of Emotional Intelligence
12	Life Cycle logistics in IT systems
13	Managing IT system Integration
14	Report on commercial applications of ILS techniques or philosophies
15	Software Portfolio Management – The Proving Model
16	Software risk management and its implication for IT strategies
17	The requirements gathering process is a major cause of project Management Failures
18	The role of prototyping and user involvement in requirement gathering and proving
19	The role of user training in Requirements gathering

IT and Corporate Managements	
1	Business Advantages of Sarbanes Oxley compliance
2	Business Costs associated with Sarbanes Oxley compliance
3	Compliance – an IT nightmare
4	Cyberslacking and corporate performance/losses
5	Developing a corporate Strategy for Document and Information Management
6	Flexible Working in IT – A way Forward
7	Gaining the business edge with IT
8	How company policy drives IT system selection
9	IS Management in the SME/large corporation/government etc
10	IT Strategies and External Business Factors
11	Management and IT Potential
12	Managers Manage but Technology Enables
13	Managing a business in and IT dominated world
14	Personal gadgets and Illegal Downloads – The curse of Organisations (iPod etc)
15	Strategies for Sarbanes Oxley compliance Implementations
16	The adaptive Enterprise (that is growing IT as it is needed)
17	The changing role of the IT professional
18	The characteristics of a Modern IT manager
19	The effect of company Policy on IT procurement
20	The effect of IT systems on company Policy
21	The Organisational Burden of Software Licensing Schemes
22	The role of IT as a strategic Business Resource
23	The Role of IT Certification in Implementation Strategies
24	The Role of IT Certification in Systems Operational Performance
25	The Role of IT Certification in terms of Strategic IT Development
26	The strategic Role of IT in business is Questionable

Email and Personal Communications	
1	Dealing with email enquires in large corporations
2	eMail - a Business Nightmare
3	eMail and ISPs
4	eMail and the personal user
5	eMail currency and its impact on personal productivity
6	eMail storage Systems and their impact on business
7	Mobile email – Taking a business Lead
8	Phishing – a personal tragedy and a corporate nightmare?
9	Skype and its use as a viable business communication suite (and other similar systems)
10	SPAM – An analysis of common content
11	SPF (Sender Policy Framework) An Answer to SPAM
12	The impact of Spam on personal productivity
13	The role of eMail in a modern business Organization
14	Then effects on business of organizations such as SPEWS in limiting SPAM

Teleworking and Telemedicine	
1	Telemedicine
2	Teleworkers and their Impact on IT security, business success, outsourcing etc.
3	Teleworking and IT professionals

IT Risk	
1	Business Continuity Planning – A Replacement for IT Disaster Recover
2	Critical Incident Management in IT
3	Improving the Application of IT related Risk Management
4	IT and Business Risk
5	IT Infrastructure and Business Continuity Planning
6	Managing business Continuity planning with highly integrated systems
7	Possible cost-based processes as critical management tools with regard to IT

IT in Finance	
1	Electronic bill presentment and payment
2	IT and Micro loans in Developing Countries (Grameen Bank and such things)
3	IT hardware – A never ending Cost Centre
4	Making better IT Investment Decisions
5	Micro Payments a route to a cashless society
6	Small Business Accounting Software
7	The effect on Profitability of implementing an IT supported Asset management system
8	The impact of IT on financial service provision has been significant.

IT Training	
1	Company policy on IT training affects user acceptance of IT system
2	IT training issues and the disabled workforce
3	The role of IT training in ensuring personal productivity

Technology	
1	Content Management systems and their place in a Modern Organization
2	Digital Paper – A new Business Tool
3	High Speed Broadband – it business impact
4	High Speed Broadband and User services
5	How new technologies related to location commerce might affect business policies
6	Keyboards and their Impact on system productivity
7	Optimising business functions by sourcing new Information technology
8	PDA Revival – Is there a Business Future?
9	Portable PCs and their business future (ie blackDog)
10	RFID in a retailing Context
11	RFID in Baggage Handling
12	Screen reading Software Efficacy as a solution to enable the visually impaired to use business software
13	Software Agent Technology and it use in improving web applications
14	Software Agent technology and its future role in mobile computing
15	Software agent technology and its role in improving search engine performance by profiling usage.
16	Sourcing New Technology for enhancing business success
17	Speech recognition system increases wider participation rates/increase worker productivity/ etc
18	The Effect of dual or triple core processors on worker productivity
19	The Paperless Society – an impossible dream?
20	Ultra Wide Broadband – and its impact on business
21	Web Based operating system – Is there a future?

Storage and Data Manager	
1	Data life cycle management
2	Entry level SAN and the SMB/SME
3	ILM (Information Life Cycle) – Controlling the Data Mountain
4	Modern developments in integrated storage management
5	Modern Societies Dependence on Electronic Storage
6	SAN and Continuous Data Protection
7	Storage Area Networks and their Impact on Business Policy

Ethics	
1	IT and its role in Social Inclusion
2	IT ethics and the economy/business
3	IT professionalism is essential for the full development of the industry
4	The effect of Ethical decision-making in the implementation of a Business Information System.
5	The Role of Ethics in Systems Analysis
6	The role of Learned Societies (eg BCS) in ensuring professional Competence
7	Who owns the Internet – A big Company Takeover
8	Copy write protection for online trade marks

Integrated Systems	
1	Attempting to integrate all systems in a company is unwise
2	Highly Integrated systems such as SAP increases worker commitment
3	Highly Integrated systems such as SAP increases worker stress
4	IT/Computing standardization of systems and the impact on business success
5	IT/Computing standardization of systems and the impact on business policy
6	Legacy Data and BI Tools sets
7	Leveraging Data and BI tools sets
8	Lightweight Enterprise Architectures - a way forward in cost control
9	Microsoft Dynamics – A challenge to SAP and Oracle
10	Migration Practices for Legacy Systems and Business Planning
11	Modern HRM systems have had a major impact on recruitment and retention of staff in large organizations.
12	Service-Oriented Architectures (SOA) – A new breed of Applications
13	Taking a cross-organisational approach to IT
14	The impact of IT on global manufacturers

General IT Products	
1	Blog Monitoring – A possible business Strategy?
2	Blogging – A possible business Strategy
3	Blogging – Is gagging bad for business
4	Business implications of the Web Bases OS
5	Implementation and training for BizTalk or Sharepoint Portal Server or Content Management Server etc
6	IT Collaboration Tools and Business Success (email, Intranets, shared files, desktops, user profiles etc)
7	Microsoft Office Business Scorecard Manager – A modern Management tool
8	Modern Software Development and its role is helping the disabled IT professionals
9	Optimisation of IT services (eg HP OpenView)
10	Search Engines and business Efficiency
11	The next wave – Computer Systems that never Fail
12	The next wave – computers that think like humans
13	The role of BizTalk or Sharepoint Portal Server or Content Management Server in business success
14	Voice activated input system and their efficiency in business situations (such as Via Voice)
15	Voice activated systems – a productivity tool
16	Web 2 a new model of usage
17	Web based desktop tools and their use in business
18	Web Services – The future for distributed systems (.NET and J2EE etc)

Document Management	
1	Document Management and support for Critical Business processes
2	Document Management Strategies
3	eBooks and Readers – their use by business
4	Electronic Documents and Record Management
5	Strategic Issues in Document and Information Management

Theoretical Issues	
1	IS needs must be matched to value in that IS systems can only be successful if there is a causal link to business success.
2	IT Application and Organisational Change
3	IT needs to be at the heart of all business plans
4	IT reporting functions and Business Instinct
5	Knowledge Management and its place IT planning/procurement/success etc
6	Mobile Technology Offers Staff a more satisfying work-life balance
7	Results oriented approach to the UI (instead of command-oriented – see 2006 MS office 12)
8	The Evolution of the Intelligent network and its business impact
9	The role of emotional intelligence in IT user support
10	The role of Web Content Accessibility Guidelines in moving web sites into the modern era
11	Trends towards shared resources on the Internet – A business Strategy

IT Services	
1	eAuction - The Future of Procurement?
2	Enterprise permeability and the supply chain
3	Impact of IT on international supply chain management
4	Improving Best practice in IT support units
5	Insuring IT based data assets and certification needs (BS 7799 ISMS)
6	IT Service Levels Agreement and Business Strategies
7	IT Service Management and Business Success
8	Outsourcing Document Management
9	Cause Related Marketing and the Necessary IT infrastructures
10	Software Maintenance – A company wide strategy for business support
11	Vendor Service and Software Licensing

Miscellaneous	
1	Community Technology Previews – A Marketing Strategy or a genuine attempt to communicate
2	Cyber Café – A world of Business
3	High Quality IT systems increases worker commitment
4	Reliance on private computer systems increases the costs of worker stress
5	The computer gadget market and its impact of Business IT
6	The Extended Enterprise (networks of suppliers, eProcurement etc)
7	The impact on worker productivity/morale of removing all personal systems
8	The IP enabled Economy

Appendix F – Sample, letter of support format

All projects require a letter of support to confirm that the data being collected is new. The letter must:

1. Be on headed note paper and signed by a person in authority within the Company/College. Their name must be also stated in full as well as their status or position.
2. The letter(s) is to be scanned in colour and the image attached to the submitted Assessment 1a Part 3.
3. A typical wording would be as follows. However, the company/college may choose their own wording or add extra sections as they please.

Company Format

This format is to be used when your research project is based on gathering data from an organisation. This format is the norm. If you are using more than one organisation then you must supply a letter from each one unless you are using a large number, in which case you must use the College format.

Dear Sir,

Re. Mr Victor Chow. Project: Planar Similarity – A new Synthetic Software Metric

I confirm that the named student is carrying out research at the above named company and I further understand that this research is part of the assessment to gain a Master's qualification. The work proposed by this student is new and I can confirm he is not using any pre-existing data.

The student has explained that the University will regard all data and results as confidential and it will only be made available to University tutors and the External Examiner and will not be published in any public forum without our full written company consent.

Any enquiries relating to this letter should be addressed to Dr Chin Wong of 0986 34571 or via email at chin.wong@ace.org.

Yours Sincerely

Dr Chin Wong

Technical Director (New Products Division)

PgD College Format

This is the format to be used when your research project is based on gathering data from where there is no obvious organisation involved. This is expected to be the exception rather than the norm.

Dear Sir,

Re. Mr Victor Chow. Project: Planar Similarity – A new Synthetic Software Metric

I confirm that the named student is carrying out research on the above named topic and I further understand that this research is part of the assessment to gain a Master's qualification.

I have checked the student record and questioned him about previous project work and I am assured that the work proposed by this student is new and does not use existing data and that this is representative of a new project idea.

The student has explained that the University will regard all data and results as confidential and it will only be made available to University tutors and the External Examiner and will not be published in any public forum.

Any enquiries relating to this letter should be addressed to Dr Philip Ling of 0986 34571 or via email at p.ling@ace.uae.org.

Yours Sincerely

Dr Phillip Ling

Director of Studies

Student Workbook Pack

Research Methods for Master's Students

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1. WORKBOOK 1. MASTER'S PROGRAMME OUTLINE

The Master's programme has two units of study: Research Methods and Project and the online programme notes together with this workbook pack cover all the information you need to complete it.

1.1 University Expectation

The University expects that when students submit work it is the very best they can do. In practice this will mean several things and all of them will be examined when work is assessed.

English – written English must be of a Master's standard and that means an IELTS score of at least 6.6 (or equivalent) is needed. If submitted written work is judged to be below this standard, students will NOT be allowed to progress to the project stage no matter what their actual language certification states.

Structure – work must be well structured and coherent. In practice students will most often work with a pre-defined set of headings and they must be used explicitly without deviation in their implied content.

Preparation – good work can only be produced if there has been adequate preparation. This will mean a thorough study of any and all references and exercises. Study does not mean a quick read through the notes or academic arrogance which says "I don't need it" or "I know all this stuff". This preparation also means working through the topic idea for your project itself so that one becomes expert in a particular field.

Instructions and Guidance – all the work you submit will have to meet various standards in terms of layout and format and students are expected to follow such guidance diligently.

Using other people work – all work submitted must be the student's own but within that work they may refer to the work of others but all material used must have proper attribution. Thus, if another author's work is copied, paraphrased or summarised it must be properly cited. Students need to understand that paraphrasing (putting things in your own words) and summarisation will amount to plagiarism if not properly attributed. This is a very serious matter and the rule with regard to copying is very simple. If 6 or more words are copied then the sources must be cited and if 10 or more words are copied without attribution then that is regarded as proof of plagiarism

Student's Own Work – the submitted work must be entirely constructed by the student and to do this it is necessary to weave into one's own ideas and thoughts the work of others. One may use the work of others to lend support to a proposition, or to include a definition or an explanation and so on. In other words it is not so much a question of how much of another person's publication one uses but what one does with it in constructing one's own research work. In short scholarship is acknowledging and using the work of others whereas plagiarism is using the work of others and in so doing attempting to fool the reader into thinking it is one's own.

Respect – when writing one is doing it for another person to read and it's therefore a grave sin in those circumstances not to offer the very best one can produce.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying and it is not just common knowledge or obvious. The key task is to formulate one's own ideas, in one's own words by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

1.2 Overview of Unit Assessment

The two units: Research Methods and Project are assessed separately and students must in each one gain at least a pass grade in order to qualify for a Master's award. The assessment artefacts are.

Research Methods Unit (15 Credits)

The Research Methods Unit will be taught over approximately 12 weeks and assessment details will be published to you early in the Unit. The assessments will be to provide project specification plus a short literature review

Project Unit (45 Credits)

The Project is an extended research exercise where students will be guided by a personal supervisor. For students who have passed assessment 1a, approved projects will start a few weeks after the end of the Research Methods Unit and last for at least 18 weeks. There is only one assessment and that is to prepare a project document based on the specification developed in Research Methods Assessment and is required in the Project itself can be found in Workbook 9.

1.3 Research Methods Unit Assessment Overview

This unit of study requires about 150 hours of effort from each student and will cover research principles, research ideas, research techniques as well as statistics. Assessment details and due dates will be made available early in the study period for the Unit in WebCT. It is essentially in two parts as follows.

Project Proposal Approval – when the Research Methods unit begins students need to gain approval for a project title/idea. The university will supply a list of ideas or students may bring one of their own as long as the related project outcome has a strategic business IT dimension, it is new work, it involved learning in IT and it is a Master's level activity. In the approval process students have to write a short submission to a set format and send it in a plain email to the Research Methods tutor whose decision is final.

Approved – the submission, whilst not necessarily being perfect, meets all the above project criteria and the outline is judged good enough for the student to begin work on the specification. About two weeks after approval is granted a supervisor will be allocated who may assist you in finalising the project Specification.

Permitted – the submission has a suitable idea but its construction is judged to be of poor quality but the student is given the benefit of the doubt and is expected to make good in the specification. No supervisor will be allocated and final approval will be depended on the quality of the final specification.

Rejected – the work is received after the due date or submission does not meet the criteria for a project in this degree and a new topic must be chosen and a new application made. Most often this is because there is no Strategic Business IT, the project research is regarded as trivial or plagiarism is detected.

Short Literature Review and Specification Approval – based on an approved or permitted project proposal students prepare a short literature review and full project specification which must be posted into a WebCT drop box on or before the assessment due date. The Research Methods tutor will review the work and write a feedback report for each student. The specification and feedback report will then be placed before a University panel who will decide whether it is appropriate for a Master's level project. At the end of the specification approval process one of four outcomes is possible:

Pass and Specification Approved – students who obtain a Research Methods pass will be allocated a project supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Approval will not mean that a specification is perfect and it is expected that students will take note of any feedback given by the Research Methods tutor or the allocated supervisor to further refine it.

Pass and Specification Conditional Approval - students who obtain a Research Methods pass will be allocated a project supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Conditional Approval means that there are some significant concerns that must be addressed before work begins and students are expected to redraft their specification, based on feedback given by the Research Methods and in discussions with the allocated supervisor.

Fail and New Topic – this means that a student specification has been rejected in its entirety and another topic must be chosen and work must begin again by seeking approval for the new topic before writing a new specification for submission in the next available cohort. This action is most often used when the University decides that the work is trivial, or the work has no significant IT content, or the student has submitted a specification without gaining approval for the topic, or plagiarism is identified.

Plagiarism is Identified – no result will be confirmed and no approval is given and the relevant student work is subject to review by a disciplinary panel. Plagiarism is a form of deliberate deception in order to gain advantage and will always be treated with the utmost seriousness and may even result in students being dismissed from the course.

1.4 Assessment - Master's Project

This unit of study requires about 450 hours of effort, guided by a University appointed supervisor and based on the specification developed earlier in the programme. The actual project document must be supplied in the form shown in section 9 of these notes and is expected to be of about 15,000 words maximum (excluding appendices).

Once allocated a supervisor, students will be asked on what date they wish to submit their project. The only rule regarding project activity is that it must last at least 18 weeks and no more than 1 year but it will be a matter for students to negotiate with their supervisor and the University to agree a submission date. Students are allowed to make small changes to the specification during the project process but they must be approved by the supervisor and must not amount to a change of the topic that was approved.

2. WORKBOOK 2. RESEARCH METHODS CHAT AND STUDY PLANS

This is a general plan for study where chat sessions are important because they are collective and interactive and typically focus on just one important feature of research and to get the best out of the course students need to prepare for them properly: reading the notes, studying the samples and exercises and multi-choice tests that go with each notes chapter, the Workbooks and contributing if you can to the discussion boards.

2.1 Contact Mechanism

Contact with students is through email, discussion boards or chat. Email is very important and you should ensure that you use an Internet based service so that you can get mail almost anywhere. It is not recommended that you use a work-based email account as these are often tied to a location and in any case its not regarded as professional to get course email mixed up with you work ones.

It is good practice to create an email account just for the duration of the course and a common choice is GoogleMail because the storage space is, for all practical purposes, unlimited. If you are not able to create a GoogleMail account let me know and I will send an invitation to you. It is important that only ONE email account is used for communication and that address is made know to the Research Methods tutor as follows.

Whatever, mail system you use it is advisable to set mail forwarding from both your WebCt accounts to your personal one to ensure that you get mail as soon as it available. It is also useful if students have a Skype or IM account as many tutors allow direct access if they are online. Skype is preferred since chat, voice and video are all catered for and during contact one does not get bombarded with advertising. Internet email services vary considerably but my recommendation is that you only use a service that:

- Provides a virtually unlimited storage capacity
- Guaranteed to work from almost any location: hotels, airport, etc
- Allows you to set a mail forwarding address (most services do not so check this with care)
- Provide quality SPAM filtering, virus checking and is not on the SPEWS blacklist
- Has an https:// internet address starter (also shown with a yellow lock at the bottom of the screen)
- Allows POP redirection (so you can use Outlook and send from databases etc)

2.2 Complete Study Plan

Students must work in a committed way for the 12 weeks during the Research Methods unit and submit the work required on the set dates – there will be no extensions given other than for sickness or other indisposition (in which case students need to complete an ECF and provide documentary evidence of incapacity). Failure to deliver on time without permission will mean that the student unit result will be recorded as a fail. For the whole course the timings in hours are approximately as in the following tables:

Course Element	Time	Comments
Chat Sessions	25	Including preparation and summarizing the chat log
Regular Visit to Site	25	For email and discussion board
Study Notes/Text Book	35	Including making notes and doing the tests
Preparing Submissions	65	Including reading the relevant workbooks and topic details

Table 1. Overall Research Methods Unit Study Plan

2.3 Recommended Timings for Completing the Research Methods Work

Look at the following list of times for preparation and plan a way through this unit using these estimates.

Course Element	Time	Comments
Literature Searching	10	The key to a successful submission of the assessments is that ones mind is fully prepared with all the knowledge needed.
Proposal	10	Here students prepare a project proposal: presenting problem, target, outcome, actors and Research Question. The format used for this can be found in the Assessment description
Research Plan	10	Here students prepare a plan for collecting primary data. This is not literature searching, it is new and original research
Short Literature Review and Project Specification	35	A partial short literature review and comment is provided in Workbook 4. The Project Specification format is presented in Workbook 3.

Table 2. Coursework Submission Plan

2.4 Recommended Five Week Development Plan

In this course students must write a project proposal as soon as possible using the format set out in the Assessment papers. However, the basic project idea must be developed and refined carefully and typically it will be done in the sequence shown below where items in blue are specific to Engineering and items in red specific to study projects. Typically this refining process starts in week 3 of the course

There is NO short cut in this work and the standards are very high. The expectation is that you will read and study the notes, examples and exercises with dedication and care. Failure to study with care is usually obvious in the quality of the work presented, so work hard and think through carefully all the steps below – there is NO substitute for thinking your own idea through. There are plenty of examples to guide you but these examples are not templates they are there to help you gain understanding and not as some sort of quick fix to the work.

Topic Area Research – this is about thoroughly understanding the topic area in which your problem is set. For example, if one was looking at Inventory Management using IT in a fast moving retail environment that is where your literature research efforts are to be directed. So one would look at inventory management itself, warehouse based systems, shop shelf systems, POS systems, tracking fast moving but small value items, restocking, forecasting, re-ordering and so on. The idea is that you take time to think of all the aspects of the topic and then you try to become knowledgeable in them. There is no short cut here and the work must be done thoroughly and with commitment.

Presenting Problem Definition – every project will be based on a real-world problem of some kind. Students must define the problem as accurately as possible but the intention is to have just ONE problem definition. (See Workbook 6 section 6.2 and 6.11)

Target – this is what real-world effects will be observable if the problem can be solved. For example, the problem might be about accuracy in inventory records and that would imply that if we can find a suitable project outcome, such as a training plan, that can be used to alleviate that situation then it will result in the target of for example reduced inventory costs. (See Workbook 6 sections 6.3)

Theorizing based on the problem Theme – here one theorises about possible causes of the problem and corresponding solutions. In the case of inaccurate inventory records we might theorize solutions as being based on: production of a training plan for staff, feasibility report on possible use of technology, development of a sales policy and so on. (See Workbook 6 section 6.6)

Project Outcome Form – during theorization one chooses what might be regarded as a best solution route and this becomes the single outcome intended for a project. For example, if we take the problem mentioned above of inaccurate inventory records then a project outcome could be a feasibility report on the use of RFID as this might be seen as a way of solving/partially solving the stated problem. In Engineering projects the outcome will be an application of some kind and that needs to be described. (See Workbook 6 section 6.4 and 6.11)

Actors – once we have an acceptable outcome we must link it with a situation actors. That is we must say who (persons) will use the outcome and how they will use it to get the stated target effects. (See Workbook 6 section 6.5)

Research Question – here one tries to encapsulate the problem definition and one's outcome theorising into a concise and lucid question that will form the focus of the research effort. (See Workbook 6 section 6.8).

Research Design – this is the core of any project and it is the place where one expects to see serious and consistent thinking about how the presenting problem is to be resolved by collecting and processing primary data in order to generate the expected project outcome that will eventually lead to a real-world effect or effects called the project target. (See Workbook 3 section 3.3.6 and either 3.5.1 or 3.5.2 as appropriate)

2.5 Critical Reflection

Students must expect to go back and forth over their work because as knowledge and understanding grows one will inevitably see that some of one's earlier work was incorrect or not as clear as it could be or maybe it can be improved in some way. This revision strategy is very important as a common fault with research work is that it often lacks consistency because there was no serious reflection on earlier work.

2.6 Chat Session Profiles

The following is a simple guide as to what students will be covering in the online chat sessions. These sessions are extremely important as they are usually interactive and are based on using examples. The Research Methods Unit will involve a chat session roughly once every week – half these sessions will be based around the notion of research methods and half based on statistical processes.

2.6.1 Chat Session 1 – Setting up a Project?

The chat will focus on the idea of a presenting problem, target, outcome and actor as the basic project building blocks. From this the chat we will move to discuss a framework to surround a research project and a look at the notion of primary data and some of the core techniques that must be mastered. To prepare for this chat read Workbook 1 and 2 and Workbook 6 section 6.2 to 6.7.

2.6.2 Chat Session 2 – Refining a project Idea?

This chat will take the form of a discussion on how a project idea is explored and focused and a full example will be used followed by an open discussion and questions from students.

To prepare for this chat, students should be familiar with the title approval format shown in the Assessment papers and the specification examples and notes shown in Workbook 3 sections 3.5.1 and 3.5.2. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea. Of particular concern in this chat is the notion of presenting problem Workbook 6 section 6.2 and form of answer (project outcome) in Workbook 6 section 6.4 and 6.11. Students must work hard on these three ideas if they are to form an acceptable project specification.

2.6.3 Chat Session 3 – Problem Solving Method and Research Designs

In this session various problem solving idea will be explored from the most general to models that are focused on particular type of problem areas. Within these models we shall discuss the notion of what data might be needed to answer a research question and how that notion must be focused. To prepare for this chat students should be familiar with the title approval format shown in the assessment and have studied the specification example shown in Workbook 3 sections 3.5.1 or 3.5.2 as well as the associated notes in section 3.1. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea.

2.6.4 Chat Session 4 – Literature Reviewing and Working in a Scholarly Manner

In this session some examples of student work and how they write down their ideas will be examined based on scholarly principles. This will be followed by looking at a process that applies equally to what one writes and what one reads. The remainder of the chat will examine several excerpts from student work that exhibit common faults. To prepare for this chat read Workbook 8 on citation styles and bibliography, chapter 4 of the notes and Workbook 5 and it might be useful to read through the sample short Literature Review in Workbook 4. In addition, it will be useful if one looks at one's own way of using primary source materials and find some examples that are good and bad.

2.6.5 Chat Session 5 – Aim and Objectives

This chat will focus on how to write an aim and a set of objectives based around a problem definition and a Research Question. To prepare for this session read Workbook 6 sections 6.13 and Workbook 9 section 9.7.3 but also consider one's own project idea and what might be suitable in that case.

2.6.6 Chat Session 6 - Open

This chat will look back over the course and typically review faults that arose out of the assessment of the project specification. This will be supplemented by a discussion as to how various project elements: title, research question and Basic Activity for Generating Data, aim (not aims) and objectives are constructed but focused on the basic Activity for Generating Data.

2.6.7 Extra Chats - Open

For some courses there will sometimes be an open chat on Sunday at 1400-1500 where students may bring their questions, comments, concerns or grumbles. These are useful sessions but only when students come prepared with items that they need to discuss. These are not teaching sessions so the tutor will have nothing to say unless students come prepared with questions and are willing to participate.

3. WORKBOOK 3. PROJECT SPECIFICATION NOTES AND EXAMPLE

This section contains some guidance notes and sample completed project specifications - please consider them carefully. Do NOT copy them blindly – they are just for guidance although the headings to each section are mandatory therefore students must write their own entries under each heading in a way that matches what they want to do. The aim of the specification is to state a complete project plan as clearly as possible so one needs to be concise and precise.

3.1 Project Styles

In projects two styles are commonly found. There are some restrictions on these two forms depending on what programme you are on but the Tutor will advise on that issue. Briefly the two styles are as follows:

Engineering – here you design and build a software application, create a system design etc.

Study – here you design a research program to collect primary data in an attempt to find an answer to an interesting question. For example, one might investigate whether cascading styles sheets lead to simpler accessibility or you might evaluate the role of email management in business success.

3.2 Specification and Design

The following notes and samples for project specifications may help you prepare your own. In summary, one needs to think of the whole processes as starting with a problem definition and ending with a solution (your project outcome) and the element that connects these two things is your research design. It follows that unless you have a good design you will not be able to get from your problem to your outcome and that will mean your project fails.

3.3 Project Specification Headings and Formatting

All the following main headings and subheading must be used and students must not introduce others. As these guidance notes are read it is advisable to also look at the relevant examples in section 3.5 so that one can clearly understand what is being said.

3.3.1 Specification Header

Make sure all your details are entered correctly otherwise work may be misfiled or rejected by the University because we cannot ascertain whose work it is.

3.3.2 Project Title Construction

Project titles must make clear sense in English and not be overlong. See Workbook 6 section 6.14.

3.3.3 Project Task Description

The main function of this section is to explain what is going to be done using the suggested headings below and as shown in the sample. The headings are intended to be precise and if students ignore or change them or use them for any other purpose the work will be rejected. The actual selection of headings will depend on the type of project: Study or Engineering.

Engineering Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct an Engineering project task description and must expect to go over them many times before a concise and useful description is formulated. For Engineering projects please note that a functional description means that one says what the application will do for the users and not how it might be built or what architecture is involved.

Situation Overview – express here a concise and high level description of the existing or proposed application area.

Presenting Problem Definition – a concise definition of some real world problem related to data processing of some kind. This is an important step since unless one can clearly see what the problem is then any solution suggested may be deficient in some way. In most cases the problem definition in engineering projects is related to elements such as data availability, searching, access speed, storage, processing, accuracy, sharing, reporting, entry, updating, deletion, control, security, volumes, segregation, consistency, worker efficiency, process systematization, communication and so on. For the purposes of writing a specification the expectation is that students will focus a problem definition on one major aspect of the application scenario. See Workbook 6 section 6.2 and 6.11.

Real-World Target – a summary of the real world effects that are expected if this problem can be solved or partly solved. (See Workbook 6 section 6.3)

Application Proposal – expressed as a concise description of the main system functionalities. When describing the main functionalities it should be done at a high level and it is recommended that they are all coherent and there should be no more than 10.

Ethical Overview – express here a concise review of any ethical impacts of gathering the primary data, processing it or system usage.

System Architecture – a concise description of the major or main architectural elements of the proposed application

Strategic Value – expressed as a concise argument that the application is able to deliver to the stated problem definition.

Study Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct a study project task description and must expect to go over them many times before a concise and useful description is formulated.

Situation Overview and Problem Setting – a concise, high level description of the context in which the research is set.

Presenting Problem Definition – expressed as a concise statement of the single underlying problem leading to this study. This is an important step since unless one can clearly see and define what the problem is then any solution suggested may be deficient in some way. Study projects look at an aspect of strategic business IT and that might cover technology effectiveness, IT investment, user acceptability, development or improvement plans, feasibility studies, legacy systems and so on. See Workbook 6 section 6.2 and 6.11.

Real-World Target – what desirable real-world effect or effects are likely if the stated problem can be resolved or partially resolved? (See Workbook 6 section 6.3)

Intended Project Outcome, Actors and Data Spotlight – write a concise statement that expresses the expected major project outcome as it arises out of the stated problem definition and your personal theory and would be an answer to the Research Question. See Workbook 6 section 6.4, 6.8.4, 6.11 and 6.5.

Research Question – expressed as a concise question that captures the problem definition and the real-world target along with other necessary features. See Workbook 6 section 6.8.

Ethical Overview – a concise review of any ethical impacts of gathering the primary data, processing it, presentation or usage of results in the form stated

3.3.4 Overall Project Aim

This is a vital point in the specification because in a very concise manner a researcher brings together in one aim: the main project **activity** to get a stated project **outcome** as well as telling us what **data** is the focus of the activity and finally what the purpose or **target** for the project outcome is in relation to real-world problem resolution. It is essential that you fully understand these four elements as described in Workbook 6 section 6.13, 6.13.1 and Workbook 9 section 9.7.3.

3.3.5 Set of Project Objectives

To meet an overall aim it is necessary to achieve a number of milestones indicated by a set of objectives generating minor outcomes. Objectives can be hard to write and it is expected that there would be between 3 and 6 of them. See Workbook 6 section 6.13 and 6.13.2, Workbook 9 section 9.7.3.

3.3.6 Research Design

The Research Design is the core element that generates primary data set and processes it into your project outcome. The Research Design is divided into two phases.

Design for Collecting Primary Data - a process or processes used to define and create a primary data set. It has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the actual data and present that data.

Design for Processing Primary Data - a process or processes used to manipulate the structured primary data set to get the expected project outcome.

A useful analogy for a Research Design is that it is like deciding that you want a sponge cake and then working with a shopping list (a list of primary data that you want) to collect a bag of ingredients (collection of the listed primary data). Once we have our ingredients (primary data) we use a recipe to prepare and mix them (pre-processing the primary data) ready for the final processing step to bake the cake (like generating your form of answer). To reverse the analogy, if you were going to make a cake you would not walk into a shop and just pick up a random set of ingredients and then mix them all together into some muddle, bake it and expect a cake to emerge - no one but an idiot would do that would they?

The suggested headings to use are as follows and you are recommended to use them carefully in a step by step manner to construct a research design. You must expect to go over them many times before a concise and useful design is formulated. In the examples I have added the step numbers for clarity but you do not have to do that in your own work as long as all the elements are present.

Engineering Projects Research Design Format

Research Design Phase 1 – Requirements Collection Process

This phase is concerned with a process that generates a reliable collection of primary data which in an engineering project will be a set of requirements. See Workbook 7 section 7.14.

Define – here one bases the definition of requirements on the outline proposal document.

Location – state where or from whom the requirements can be found.

Collection Protocols – here it is necessary to select appropriate collection protocols such as: interview, observation, records searching and so on needed to collect the requirements under the standard four headings: Functional, Non-Functional/Performance, Technical and Usability. See Workbook 6 section 6.7.1.

Requirements Presentation – the requirements data once collected will typically be presented as interview transcripts, notes and copies of documents and lodged in the project document appendix as a kind of requirements catalogue.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulate it to get a design for the application. This is in two sections.

Overview – show how the various requirements are expressed in a design.

Specific – in any design there will be aspects that have no obvious means of expression and such aspects are typically written as a list.

Study Projects Research Design Format

Research Method – make a selection and write a concise rationale for its use. See Workbook 7.

Research Design – Primary Data Collection process

This phase is only concerned with generating a reliable primary data set and is based on the Basic Activity for Generating Data but to be it has to be surrounded by a complete process.

Activity and Data Spotlight – a concise description of the activity that forms the core of the primary data identification/spotlighting and collection process. It is expected that you will name some primary data items here. See Workbook 6 section 6.9, 6.10 and 6.11.

Location – a concise description of where the primary data may be found. In practice it may come from almost anywhere including extraction from existing secondary sources.

Collection Protocol – a concise description of the actual collection procedure which may be based on one or more of the following: interviews, questionnaires, observation, roles playing, document analysis and so on. See Workbook 6 section 6.7.1

Primary Data Collection Presentation – expressed as a concise description of the way in which the primary data will be presented.

Research Design – Processing and Presentation

This phase is only concerned with a processing the primary data set in order to get the expected project outcome.

Design of Pre-Processing for Primary Data Collection – a concise description of the processes applied to the raw primary data to generate a refined and well structured data set expressed in a fashion that makes it suitable for generating the intended project outcome. (Workbook 6 section 6.7.3) (Please note that this step will not always be needed)

Design for Generating the Intended Project Outcome – here the structured primary data set (pre-processed if necessary) is used in some algorithmic or heuristic fashion to generate the intended project outcome and show that in its final form it can be used by situation actors to gain the target effects.

3.3.7 Literature References

This section is used to assess how well a student has prepared for the project activity. The University will want to see that the reading is current, comprehensive and focused on the topic area. It is expected that work in the specification will be supported from the literature particularly in the outline description and research method sections. Unless the literature is seen to be used in the various sections of a project specification it may not be approved although it is not expected that one cites from every book in a reference list. See Workbook 5 and Workbook 8 and make sure citations are in the Harvard APA style.

3.3.8 Project Planning

The plan must be developed by looking at the outline project document contents list and considering what activities are necessary to generate the various project objects. Aim for around 12 to 20 activities lasting at least 18 weeks with any suitable start date. A project activity is something that is significant and requires planning and monitoring. So for example:

Prepare Metric Program – this is clearly a significant activity that has to be planned and monitored and so properly part of the plan

Select an Organization – this is an activity and might be important but it is doubtful if there really is a significant process involved here that has to be planned and monitored.

Outline Implementation Plan – this is not an activity so should not be in the plan.

The University will examine each plan and will want to see that it is focused on the project – the implication here is that it should be possible to see that a given plan supports a particular project idea not just a copy of one of the samples or is so generic it might apply to any project.

3.4 Testing Your Problem Solving/Research Design

A design must amount to a logical plan that takes a problem definition to a description to the expected outcome that will resolve the stated problem. The following are a useful check that a plan is sound.

Practicality – consider whether one has the resources to be able to carryout a plan. This is a very serious step and must not be taken lightly. It is all very well to have an elaborate plan on paper and to think because it all sounds logical that it can actually be done. In many cases a crucial test of practicality is to be sure that one can get the data from the locations specified.

Credibility – here one is expected to be honest and decide whether the plan will result in useful data and outcome. It is unfortunately true that many research projects end up being trivial because of poor identification of data and more importantly the choice of appropriate collection protocols. It is also worth considering the data processing functions as they must also be credible.

Confirmability – this test is about what would have happened if the same research was done a second time with the same data – would the researcher end up with the same answer. To put it another way, is the processing method too dependant on an individual and that dependence may lead to bias.

Trustworthiness – here we are concerned that the conduct at all stages is such that one could have confidence that the results are genuine and not manufactured.

3.5 Example Specifications

Here are some sample specifications, they are complete except for the contents list and project plans but they are not meant to be copied without any conscious thought and any obvious attempt to do so will result in specification rejection.

3.5.1 Example Complete Engineering Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Engineering) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – the customer is SIS and the application is expected to go live by June 12, 2007.

Project Title - An Assessment Marks Processing Application. (See Workbook 6 section 6.14).

Situation Overview

Currently, the core processing is done by staff members dealing with their own assessment marks, typically using Excel. The staff member then forwards his marks sheets, usually in paper form, to the administration office where the marks are collated using Excel to give an overall score for each student. These two marks sheets: individual unit marks and overall student marks are then presented to the Board of Examiners for scrutiny and acceptance. The process ends when a transcript is sent to each student detailing their results for that semester.

Presenting Problem Definition

The actors feel that the root problem is about consistency and accuracy given the sensitivity of the data but coupled with difficulties with storage, retrieval and reporting. (See Workbook 6 section 6.2 and 6.11)

Real-World Target – the desired effects here are that consistency and accuracy are both improved but at a reduced workload. (See Workbook 6 section 6.3)

Application Proposal

Based on the presenting problem there an application is needed that can offer us consistency and accuracy in the processing of assessment marks, both by unit and by overall student performance. The system to be called a mark processing system and it will have the following main functionalities. (See Workbook 7 section 7.14)

Functional Requirements

1. Store name, address, year of study, name of course and unit details of all registered students.
2. Store the assessment patterns for each unit including weights and pass mark.
3. Allow for the entry, updating and deletion of any or all records.
4. Allow for the entry of assessment marks for individual entry or by batch updating via CSV
5. Report on marks for each unit including basic statistics.
6. Report of overall student performance, including basic statistics.
7. Produce student transcripts.
8. Provision for other ad hoc reports at a later date.
9. Secure access to individual results to be available to students through a portal.

Non-Functional and Performance Requirements

1. Store records for at least 6 years.
2. Allow for at least 6 simultaneous users
3. System must be capable of processing all the data and providing the reports within 10 working days. The estimated current volume is 145,000 data entries and 139 reports but this is expected to grow by about 7% per academic session.

Technical Requirements

1. Be developed in MS Access 2003.
2. For use under Windows XP.
3. All processing activities, including reporting, to be carried out using native Access facilities.
4. All processing is to be done using Access VB and no macros are to be used.

Usability

1. Be developed using normal windows formats and standard colours.
2. Fonts use in screen to be no smaller than 9 point and standardised at Ariel Narrow.
3. Assumed screen size to be 19".
4. Report to be printed as appropriate but with fonts never less than 10 point.
5. Data entry load per screen to be as recommended in DEF 981.90.
6. There should be some consideration of access via the portal for the visually impaired.

Ethical Overview

The collection of requirement here does not present any ethical problems. However, when in use the system contains personal and sensitive data and this aspect must be considered in the design

System Architecture

The intended application is essentially a database system with a web link. It will therefore have two interfaces: one a direct link to the database through the Access application and the other through a secure web interface routed through a portal but with only read access.

Aim

To build an assessment marks processing system using standard MS products in order to ensure consistency and accuracy in the processing of student results. (See Workbook 6 section 6.13 and 6.13.1, Workbook 9 section 9.7.3)

Objectives (See Workbook 6 section 6.13 and 6.13.2 and Workbook 9 section 9.7.3)

1. To produce a detailed, departmentally based, mark processing requirements document.
2. To produce a detailed mark processing database design using standard documentation protocols.
3. To produce a detailed assessment functional design to include data entry, updating, deletion for marks processing and reporting.
4. To design the secure portal for student use based on University entry protocols.
5. To produce and evaluation report of the marks application.

Research Design Phase 1 – Requirements Collection Process

This part of the research design is concerned with constructing a reliable primary data collection for later processing into the form of answer expected. In this case the primary data collection is a set of detailed requirements for the marks processing application. The primary data that we need is related to the proposed major functionalities stated earlier and given to us in the form of a proposal. For each of the functionalities it is now necessary to decide. (See Workbook 7 section 7.14)

Location – The requirements can be found at various locations in Portsmouth. In particular

Detailed Functional Requirements: the appropriate targets for this exercise are: SIS office administrators, departmental course leaders, individual academic staff, Heads of Department and the University registry (for regulatory aspects). It may also be useful to make contact with a number of external examiners to ensure that the reporting arrangements are acceptable. In addition there will be various documents such as regulations and marks sheets

Non-Functional and Performance Requirements: the appropriate targets here are the Registry since they set examination and graduation dates as well as define the necessary reports. The office senior administrator also needs to be consulted for staffing and usage issue. During this process there must be detailed discussion with the department and the Registry over security

issues as this is a major ethical issue. In addition there will be various documents such as regulations, external examiner reports.

Technical Requirements: the appropriate target here is the departmental technical to establish hardware and software profiles. It may also be necessary to discuss network and security issues with the University central computing department. It may be necessary to see network and PC specifications and various security profiles.

Usability Requirements: the basic design is based in Windows protocols so there are no particular requirements to be gathered. However, because it is possible to implement interfaces in a few ways particular usability requirements will be ascertained by use of a mock-up used with the administration staff. With regard to the Portal there will need to be discussion with the University webmaster over formats and protocols to be used. In addition there will be various documents defining standards and formats.

Collection Protocols – The collection is essential a survey format where each requirement aspect will be discovered by just three formats: (See Workbook 6 section 6.7.1)

Detailed Functional Requirements: expressed as interviews, document analysis (marks sheets and regulations) and some observations. It may also be necessary to use observation to examine any existing Portals.

Non-Functional and Performance Requirements: interviews, document analysis (marks sheets and regulations) and observations.

Technical Requirements: interviews and document analysis (system specifications and profiles)

Usability Requirements: interviews and document analysis (system specifications and profiles). In addition it will be necessary to run some focus groups to look at various interface design option by means of mock-ups.

Requirements Presentation – the requirements data once collected will be presented as interview transcripts, notes and copies of documents. These artefacts will be reviewed and a tabular format used to present the requirements and lodged in the project document appendix.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulates it to get a design for the application. This is in two sections.

Overview – here the vehicle used to present the various requirements in a design format will be UML. The mechanism will be to take the written requirements documents and map them to a suitable diagrams in the form of use cases, class diagrams and where appropriate collaboration or sequence diagrams.

Specific - where necessary a written list will be provided. These will mainly be used to state unambiguously the various non function, technical and usability details.

References (See Workbook 8)

Walker (2001), IT Problem Management, Prentice Hall, 0-13-030770-5

Bruton (1997), How To Manage The IT Helpdesk, Butterworth Heinemann, 0-7506-3811-7
etc

Project Plan

Any clear format may be use but a typical format (but not events) can be found at the end of the Study Project sample specification.

3.5.2 Example Complete Study Project Specification

Here is an example study specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Engineering) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Project Title - Quality Control in Program Development - A Possible Strategy (Workbook 6 section 6.14).

Situation Overview and Problem Setting

The research is set in The University of Portsmouth with the School of Information Systems. In that context it will focus on the programs produced by first year computing undergraduate students.

Presenting Problem Definition

The problem for developers is focused on knowing when code is robust and ready for release. (See Workbook 6 section 6.2 and 6.11).

Real-World Target

The benefit that would accrue in the real-world if this problem can be resolved or partially resolved is that developers can detect potential errors at the code stage and hence feel more confident about their product and therefore not risk costly development overruns and compensation claims from clients. (See Workbook 6 section 6.3)

Intended Project Outcome, Actors and Data Spotlight

It is expected that the form of the answer arising out of this work will be a demonstration in the form of a report with graphical evidence that endorses the proposition that Planar Similarity is an appropriate software quality indicator in that outliers can be detected from application code and in so doing produce an error indication protocol and hence the target effect is gained. It follows that the data spotlight will involve calculating various software metrics from application code and inferring a software defect.

It is expected that the error indication protocol will be used by software developers to pinpoint errors in code and hence guide them in the design of generic program templates and in the testing phase and hence help to ensure that product confidence is heightened and cost overruns do not occur. (See Workbook 6 section 6.4 and 6.5)

Research Question

What (**interrogative**) software error identification protocol (**outcome**) based on use of the planar similarity metric, is available to software development engineers (**actors**) to ensure that software applications are ready for release (**problem**) in order to meet development time scales and ensure client satisfaction (**target**) by examining its efficacy in pinpointing software defects at the code stage (**spotlight**)? (See Workbook 6 section 6.8)

Ethical Overview

There are no current users of the process being developed and at this stage there not seem to be any ethical consideration of importance. However, it is necessary to explain to the students supplying the sample programs the purpose of this study and assure them that none of this information will be used for assessment and allow them access to the results if they so wish. If the target actors use this method then it would possibly expose programmers competences to managers and this may have a negative effects if it is seen not as an aid but as a kind of assessment of their abilities.

Aim

To report (activity) on the efficacy of the Planar Similarity measure using simple metrics as a means of finding outliers in program code (spotlight) and hence reduce coding errors by means of an error identification protocol (outcome) leading to development cost reduction and client approval (target). (See Workbook 6 section 6.13, 6.13.1 and Workbook 9 section 9.7.3)

Objectives (see Workbook 6 section 6.13 and 6.13.2 and Workbook 9 section 9.7.3)

1. To model the application software construction process based on an extensive literature review.

2. To report on appropriate simple and synthetic metrics that might be used as indicators of quality in application programming code.
3. To define a process that will extract the defined metrics for any piece of application code.
4. To document a suitable statistical process for reducing the metric values set to just two dimensions.
5. To analyse and report on the data, including outliers, and hence derive some general conclusions regarding the utility of the Planar Similarity metric and its error indication properties.

Research Design - Research Method

This research is aimed at giving an indication (loosely proving) the efficacy of the Planar Similarity metric within a given context. With this in mind simple experimental procedure will be used as described below. (See Workbook 7)

Research Design: Primary Data Collection Process

This part of the research design is solely concerned with constructing a reliable primary data collection for later processing into the report outcome defined earlier.

Activity and Data Spotlight

The basic idea is to compare a new piece of code with an existing piece that is known to be sound and calculate a series of metrics each one that might highlight any differences and so indicate an outlier. (See Workbook 6 section 6.9, 6.10 and 6.11)

This study will define 20 software metrics which will be calculated automatically for each sample programme. The metrics that form the primary data collection for this research will be such things as: function density, function count, cyclomatic complexity, data associations, decision count, decision density, number of variables, number of function calls, etc. (see Workbook 6 section 6.7)

To set up this experiment three computer program specifications will be drafted with the students working in 'C++'. The specifications will be written so that the defined software application is, in each case, of a different application style and progressively more difficult. An expert in 'C++' will produce a set of generics to match the requested programmes types – it should be noted that a generic is an outline or skeleton of certain kinds or classes of program.

Location – The sample frame is all first year students on computing courses at Portsmouth University. This is around 350 students and my calculated sample size is 200 students, however, since the data collection process is automatic all 350 students will be used in this study.

Collection Protocols – students will be given the application relevant generics and the specifications and asked to write three computer programs of increasing complexity, one in each of three semesters and deposit their completed programmes into a drop-box. This is a large data set and for practical reasons an application will be written that will process each student program so that metrics may be calculated automatically and stored in a suitable electronic file. (See Workbook 6 section 6.6.1)

Primary Data Collection Presentation

The sets of primary data will be available in the project document appendix and will be presented in tables where the rows represent the sample programs (one row for each sample) and the 20 columns the metric values.

Research Design: Processing and Presentation

This part of the research plan will take the whole collection of primary data and manipulates it to get the expected outcome form, which was a demonstration in the form of a report.

Design of Pre-Processing for Primary Data Collection (See Workbook 6 section 6.7.3)

The metric data sets will be read directly from the files produced in the collection phase and then statistically processed to define a similarity measure for each program using principal component analysis and multidimensional scaling. The outcome of this processing will be pairs of values, one pair for each sample program, suitable for plotting in two dimensions structured as a table of results for each program tested.

Design for Generating the Intended Project Outcome

Once the graphs are available it is then a simple matter to look for outliers in particular and attempt to explain their distance and orientation from the generic and other programs in the group by a close examination of the underlying program code that gave rise to it.

The contention is that similar programs will cluster together and ones that are different (even though the specification was the same) will show up as outliers and can be identified and examined to see why that difference occurred. It is hoped that the results will be similar for all three program specification involved and hence demonstrate that planar similarity is effective software metric. Hence, by examining outliers and linking those to code fragments it will be possible to review the results and generate my report on a efficacy and a protocol for error identification. (See Workbook 6 section 3.5.2)

References (See workbook 8)

JKM Quality Assurance Handbook (Company Confidential)

Garlick, F. J., (1993), Planar Similarity - A New Synthetic Metric, SQM, Elsevier, 1-85312-225-4

etc

Project Plan - Master Schedule expressed in weeks (You may assume that a project take about 18 weeks to complete)															
Dates are Mondays	March				April				May					etc	
Event	6	13	20	27	3	10	17	24	1	8	15	22	29	etc	
Literature Search															
Identify metrics															
Write Metric program															
etc															

4. WORKBOOK 4 – LITERATURE REVIEW & STRATEGIC IT VALUE NOTES/EXAMPLES

This is a sample of what is expected in assessment 1a, however, it only shows two elements: the strategic business IT statement and the short Literature Review. Try to keep in mind that this is just ONE example and do not try to copy it blindly or try to fit it into what you want to do.

Strategic IT Value

This work was based on trying to resolve or partly resolve the problem of low quality code leading to the need for costly re-work at later stages in the development cycle. The importance strategically of this work is that the outcome: a definition of new software metric will imply that it is possible to identify poor application code and this can be done at an early stage in the software development life cycle. The importance of this is that corrective action can be taken early in the development cycle and as a consequence costly re-work late in the cycle can be avoided or reduced. A secondary or added value element is that the results will allow the identification of good programming standards and this in itself will also lead to improvement and strategic advantage on all products delivered.

Tutor Comment

The key element here is that one relates the expected outcome or form of answer to its use in resolving the problem theme that was the basis of the project, and hence demonstrate a strategic business IT value. Failure to create a clear argument based on the problem theme and outcome leading to a strategic business IT value will mean loss of marks.

Literature Review (See Workbook 5 section 5.1, 5.6, 5.7 and 5.8)

Hiskett in his 1987 seminal paper on metrics defined several apparently useful metrics, the best known of which are 'program vocabulary' and 'program length' which are essentially metrics that count operators and operands and their usage in a given piece of code. Hiskett's metrics are easy to calculate but he was unable to show any strong correlation between his measures and program quality as defined by experts in the field. Similarly, Rogers and Hamerstein tried to use Hiskett's metrics as predictors of MTBF in accounting software but the results were inconclusive and no link could be found between the metrics and the type of software (functionality), accounting in this case, and the metric used.

Garlick, Sheene and Southwood (1999, p450) attempted a new approach that involved the notion of similarity, which they called planar similarity – that is two programs could be defined as similar because: they are written in the same language or they perform similar functions or they were written to the same standards or they are written to the same specification or they were written by the same team or finally they perform the same function. Their work is aptly summed up in the opening paragraph of their paper:

"The nature of any true measurement is easy repeatability and this implies that the style of measurements form a suitable metric space. This means that we need to define the nature of the similarity before we define a measure. In principle this is simple since it is easy to name the similarities but in practice it has been difficult to articulate a precise definition."

The similarities described above deserve further explanation but here only two of them in combination are used: similar language and similar or same specification. Similar language is easy to understand but at first glance it would seem that if two different programs are written to the same specification they are bound to be the same. However, after a little thought, it is obvious that if two different people write two different programs to the same specification the programs are certain to be different in many respects. It follows that the basic, though loose, hypothesis is that if planar similarity can detect a similarity (alternatively difference) in these programs - written to the same specification but by different people - it might be possible to use planar similarity to detect differences between two or more programs against any defined mode of similarity. Conversely, if it cannot be shown that a similarity exists between two or more programs written to the same specification then there is no hope whatever of showing any other kind of similarity with this metric.

Two final points need to be considered: what exactly is meant by software quality and why would a similarity measure be a good indicator of quality? To answer the first question we have only to refer to Kitchenham's 1998 paper where she defined five kinds of quality, briefly:

Transcendent View – quality is a kind of innate excellence, something felt rather than seen.

Product Based View - quality is related to the content/attributes of the product.

User View – quality is seen as equivalent to fitness for purpose.

Manufacturing Based View - quality is equated with conformance to specifications.

Value Based View - provide product at an acceptable price and conformance to a specification.

In this study the transcendent view was the one chosen as the basis of the definition of quality. The meaning of this view is defined by experts in the field – that is, can an expert in, say, Java programming make a judgement as to whether a given piece of code is good or bad – well, here it is argued that such an expert can and does such tasks routinely. Curiously there is very little literature on this idea of expert opinion within the software community but Gavin as early as 1978 touched on the subject. However, it is a reasonable conjecture and it will be used in this study – interestingly, if it can be shown that planar similarity can detect similarity (or equivalently differences) then it would also support the conjecture that experts can judge software quality.

Finally, the study will rely on the ability of experts to judge quality in software. This judgement is exemplified in the production of exemplar or generic programs. Garlick (2003, p98) has written extensively on this subject and the work is well known and will not be fully reviewed here. However, it is possible to define classes of program modules - validation, input, calculation, reporting and so on – it follows, that using the idea of similarity it is useful to create a standard or *generic* program or module for each class. Such a program can then act as a base line for all planar distances related to its application class and hence be a measure of similarity (or difference).

Using Garlick's idea we can let experts define our generic and then use that to compare with other programs – if we declare a difference then in simple terms we need to look at that program because it might be of poor quality and conversely if we declare no difference then we can fairly conclude that the program is sound.

Tutor Comment

The literature review is supposed to be a student's own work. As such it is a discourse that outlines the major elements of topic area but amounts to an essay which is the student's alone. In practice this means that students must read deeply into the subject and then weave what is read into what the student already knows or believes in order to create a useful summary of the topic that will form a strong base for carrying out the actual primary data research - this implies that you 'master' the subject area and become expert in it.

It follows from the above that if all you do is copy or paraphrase from various sources without any significant comment or analysis on your part then it amounts to plagiarism and is worthless.

One final point is that when you write up your review in your final project document you should use various sub-headings and other formatting elements to structure the section to make it readable and meaningful.

5. WORKBOOK 5. LITERATURE REVIEW

The main function of this review is to ensure that one's mind is prepared with all the specific problem area knowledge that it needed to carry out the project and its primary research. In practice this implies the rather difficult task of integrating different ideas, theories and experiences into a thematic, informative, complete and clear discourse on your chosen subject area.

Preparation of the mind is done through adding your own critical evaluative comments and ideas on what you find in the available literature and such critical reviews are typically hard work and not about downloading a few articles from the internet. The key characteristic of the greatest thinkers in history was absolute and unswerving honesty in all their thinking and that principle has never changed. They used their intellect and reasoning abilities to the full. They were honest no matter what the subject be it religious, political, business or academic. These men would not accept dogma from religion, politics or academic sources without subjecting it to serious critical questioning and of course this often meant great suffering for them.

5.1 Plagiarism

The KEY is honesty – without that your work is worthless – you may be able to fool some people but as Shakespeare said “This above all: to thine own self be true, and it must follow, as the night the day, Thou canst not then be false to any man.” So when you plagiarize I may not know, the University may not know but YOU will always know that you obtained something falsely.

Plagiarism means passing off other people's ideas as if they were your own in short it is a form of stealing or cheating. It is fully expected that students will carry out research prior to completing a piece of work. This may include the use of books, journal articles, reports, manuals, notes and so on as source material. The material may be public, restricted to a closed set of people or with a security classification, or privately communicated. The principles are the same whether the material is on paper or in an electronic format. When you refer to an idea in a piece of your own work, it falls into one of several categories:

Common knowledge - many people know it and the information does not belong to anyone person but it cannot normally be deduced by you it has to be learned. It is probably talked about in several sources: the world is round, computers contain both processors and memory, OO is routinely used in software construction and so on. If you are sure that it is common knowledge, you do not need to cite a source. Be careful, authors will often write down in their own work things that are common knowledge so quoting them in that instance amounts to saying that a bit of what is common knowledge actually belongs to that author and that of course is an absurdity.

Obvious – many people know it and the information does not belong to anyone person but it can be deduced. It is probably talked about in several sources: companies tend to grow as time goes on, when the sun goes down it gets dark and so on. If you are sure that it is obvious you do not need to cite a source. Be careful, authors will often write down the obvious in their own work so quoting them in that instance amounts to saying that what is obvious to every one actually belongs to that author and that of course is an absurdity.

Published – this refers to an idea that is found in a specific source or sources which is not common knowledge nor obvious but is nevertheless useful – in these cases you must always cite the source or sources of such an idea.

Original – you may include freely original ideas of your own. However, be aware that if the reader sees an idea that is not cited and is not common knowledge nor obvious, then they are entitled to believe that either it is a new idea published by you or you have plagiarised it. It follows, that if you are introducing idea of your own it is necessary to make that clear by the way it is presented.

5.1.1 Identifying Plagiarism

Plagiarism does not occur only when you copy words verbatim. Plagiarism is about ideas, and even if you express the idea in your own words, you may still be guilty of it if you do not credit the source. However, expressing an idea in your own words might often be good scholarship. The difficulty is that anyone can copy and paste a phrase, sentence or paragraph and cite its source. This is technically not plagiarism, but it's often very poor scholarship since it is obvious that such an activity tells us nothing about the learning, if any that has occurred

Scholarship is about showing your understanding and criticism of ideas. Simply copying, paraphrasing or summarising can show understanding only to a limited extent. You need to “add value”, that is make your own contribution to knowledge, to what you've read and you can usually only do this by expressing published ideas in some way and mingling them with your own thoughts and ideas.

5.1.2 Common Critical Devices

Try to infuse your work with your own thoughts and ideas and let these mingle with what it is you have found in the literature. The most common forms doing of this are:

Interpretation - explaining and expanding on what you have found.

Criticism/Questioning – critically discussing by questioning in order to judge whether the ideas are good or bad.

Decomposition or Analysis – to tease out the constituent parts of an idea.

Synthesis – by means of discussion and explanation link separate ideas together.

Selectivity - showing which ideas to include and which to discard.

Abstraction - taking an overview or defining a model or framework, usually by looking at examples.

5.1.3 Common Literature Tools

The following are the most common means of incorporating, in a scholarly fashion, the work of others into your own written work (a fuller discussion of these tools may be found in the notes).

Copy – use the exact words using quotation marks. A quote may in principle be any length but a good rule is that each quote should only carry a single main idea, which you want to use and then you must introduce it and then follow it up with discussion.

Paraphrase – expressing something that you have found in the literature in your own words - the intention being to simplify, explain, or interpret a complicated idea. But take care there is a very fine line between simplifying, explaining and translating something and just being lazy about adding anything to what you have found.

Summarise – producing a précis or abridgment of a part of the source we have found. Essentially one is trying to capture the main points in an argument or description.

Analyse – the purpose here is to offer a detailed examination of some whole by scrutiny of its parts.

Synthesise – here the idea is to take parts and put them together into a new whole for some purpose.

You might find it useful to remember: copy in order to discuss, paraphrase to simplify, explain or interpret, summarise to capture the main points, analyse to understand and synthesise to build something new.

5.1.4 University Review Assessment

When the University looks at your Literature Review it will be trying to decide if you are committed and prepared for the topic and working at Master's level. If your work is poor in terms of structure, content and form you will find yourself failing. This is NOT necessary so long as you put in the work and ensure you understand how to use citations and the literature. I want to encourage you to do good work - it will ensure that you pass well and it makes your work a pleasure for the Examiners to read.

5.2 Review Content

The review is about your topic area and about you becoming sufficiently expert in it to deal with the problem that you have uncovered. The intention is for you to offer a discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (Notice the acronym FRAMED)

Focused – this means that your whole effort is focused on the topic area and the particular aspect of it that you are pursuing. So do not be tempted to add in other things just because they might be useful, interesting, and novel or you just have nothing else to say.

Relevant – any topic area aspect will itself normally represent a large body of knowledge and so one needs to continually ask if a particular element in the knowledge domain is relevant to your particular study.

Authored - any literature review is to be written by its author. This sounds obvious but it is all too easy to fill up a review with cited quotations, paraphrases, summaries and so on so that the 'hand' of the review author is not evident anywhere in the work. When this happens it is not an evaluative review at all but

simple plagiarism. The author's 'hand' must guide and direct the review in an evaluatory fashion so that the review is a message from the review author and not a recitation of what has been found elsewhere. Typically this is done by using one's own skills and knowledge to introduce, comment, add to, modify and extrapolate from various primary sources available.

Measured – this is a matter of selecting and using the focused and relevant materials that you have found. Unfortunately, it is all too easy to pack in information in excruciatingly precise detail and so end up with a laboured entry that treats your readers as if they were completely ignorant of the subject area. So here one needs to just say honestly "is the entry a measured response to my and my readers information needs".

Evaluatory – authors sift through the primary sources looking for materials to use. The essence of this sifting is an evaluatory outlook based on an awareness of your problem theme, your topic area and your own ideas. Care is needed because this process is not about searching for materials that you agree with or like in some way. Instead it is a contextualised response (what do you already know) and that may mean you find materials that are new to you, materials that make you change your own knowledge base and often materials that completely replace what you thought was solid.

Dialogue – a review is a form of argument because good ones are based on a strong theme and in them one is trying to explain to, and convince your readers about something and so it is best if you think of it as a kind of dialogue in which you vicariously challenge them about your review theme and content.

5.3 Integrity and Evidence

This heading sums up research - integrity because it must be your own work and evidence because you MUST be able to show that your results have value. There are basically 4 strands to good work as follows

Dogma – this simply means things you have to take at face value. Most often they are things that are not open to reason in the sense that one is not allowed to question them and in some countries you can find yourself in serious trouble if you do. The problem with dogma is that by definition there is no logical support for it. Just to use a simple example, some faiths require you to have a beard or not eat pork as a matter of dogma – in such cases we usually cannot logically deduce that this is a right or wrong. It may of course be simpler than that since we all invent our own dogmas from time to time – for example it may be very simple such as 'I will never buy a Ford car'.

We all accept dogma but that really is not the issue – the issue is that we should not accept it without some critical thought. There is at least one rational way of exercising critical thought on dogmatic issues and that is asking is the outcome of actions based on it good, bad, neutral or at least does not harm anyone. The trouble however, is that dogma sticks to us like super-glue and we will often go to great lengths to defend it and almost always this is done by sophistry (worthless arguments) and of course the notion of what is good or bad is not easy to define.

Reason – this is the ability to be logical and reason about what it is you are reading or writing. That is you are encouraged to ask questions and seek for a deeper understanding. This may imply that you accept new information, modify what you already know or reject something as no longer valuable.

Honesty – here we are talking about not taking things at face value and being honest with yourself about what you are reading or writing and asking does it all make sense and is it coherent with what I already know.

Motive – this aspect is about your reasons for wanting to read or write something. Now such motives can be high minded or they may be base. One must therefore always guard against tendentiousness (the author simply wants to convince a reader of something and may use any means to do it) in one's own writing and be watchful for it in the writing of others.

5.4 Literature Sources

The available literature is classified broadly speaking into the two kinds described below and ideally we only want to use primary sources.

Primary Sources – that is the first published documents. One can be really pedantic and say the real primary sources are the author's manuscript or autograph but these days we are satisfied with published sources. It will however, often be difficult to establish that something is indeed a primary source.

Secondary Sources – in almost every document you see, there will be elements attributed to other authors – these are then secondary sources.

Be careful not to confuse the above definition with those for primary and secondary data. When we talk of primary sources we are obviously referring to something that is published and exists whereas with primary data it will not exist until a researcher defined, locates and collects it.

5.5 Basic Writing Rules

For Study projects a full literature review will be needed but in Engineering projects the requirements document forms part of the Literature Review. However, even in Engineering it is necessary to write a short review just to form a technical backdrop to your project. It may help you to remember there are two cardinal rules when writing – they are simple:

Respect – always have a deep respect for ones readers and make it easy for them to understand what you are saying.

Need - only quote, paraphrase or summarize when it clearly adds to what one is saying. The key task is to formulate ones own ideas, in your own words but one does this by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

5.6 Literature Assessment

When assessing this element the University will look at how YOU use the sources in what you write and at the range of sources that you use. If either is judged deficient your work may not be accepted as the view taken will be that you are not prepared for work at this level and on this topic. It is expected that all your sources will be mostly primary ones. If there is some reason why this is not possible it must be discussed with the Research Methods tutor or your project supervisor.

5.6.1 Literature Review Ideas

All the following steps are iterative and you must expect to go backwards and forwards many times before you get a review with which you are happy.

Reading/Writing with the Intellect - This is normally thought of as a four stage process that applies equally to what is written (because it is going to be read by someone).

Understanding – this is simply taken to mean that we understand the words used.

Interpretation – are able to find meaning in the words used.

Evaluation – we ask does the meaning have any value – in essence we ask is it true or false.

Contextualization – this implies that everything we read is coloured by what we already know. This idea is taken much further in the idea of hermeneutics (see the notes).

Usage – the literature that you find and evaluate can be used to supplement your own work and demonstrate your mastery of the topic area. This does not mean that you quote, paraphrase or summarise everything you see. As a rule of-thumb: only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation.

Argument - Finally, keep in mind that when writing you are dealing with a form or argument where you are trying to persuade your reader about some point or other and that should only be attempted when you are knowledgeable, the argument is essential and you have a deep respect for your readers.

5.6.2 Literature Review Construction

Here is a plan that you can use to construct your own review. It is not infallible and will require conscious effort from you and it must be based on a thorough evaluation of the literature.

Step 1. Purpose - the purpose is to fully prepare your mind with all that you need to know about the topic area and the particular element of it that you are focusing on. The idea is that what you write shows your mastery of the topic and in fact you have become an authority on the topic area. So a review is not a long list of quotes, paraphrases and summaries, it is an evaluatory discourse. That is, readers will want to know what YOU have to say based around what you have uncovered in the literature - so readers must see what you have found and see what you have to say about it.

Step 2. Topic and Aspect - Make sure you are clear about your topic area and which particular aspect of it you need to explore and understand in order to be able to effectively carry out your planned research.

Step 3. Select a Theme - Use your project problem definition, target and outcome to guide you in selecting a theme that will connect all the various elements of your review together making it a lucid and progressive discourse. (Don't be afraid to alter the theme as you go along if that becomes necessary)

Step 4. Your own Views - Try to make a list of your own views, ideas and knowledge. Remember, the review is an evaluation of what you find not a recitation of it. If all you do is tell us what you have found you may not even pass because almost anyone can write a review on any subject if all that is required is to more or less recite what has been found. So you must structure the review around your theme and your own ideas and thoughts.

Step 5. Make a Review Content list - Based around your theme make a list of all the various topic strands that you need to know about. It may help you to think about strands such as: organisational, administrative, functional, social, technological, cultural, ethical and so on or some other structure best suited to your topic – but it must be progressive and logically take you through the topic area. This is not about writing down everything you know it's about giving your readers a focused discourse on your chosen topic area. Commonly it is found that it is useful to start as follows.

5a. Basic definitions and terms that need to be clear for the core topic area. (Be careful to note any abbreviations)

5b. Map out several important areas or problem space dimensions. Now it is impossible to be general here so for example if I were looking at mobile devices and their use in business I might map out the following elements: value, attitude, use, limitations, practice cost, ease of use, learning curve, effectiveness and so on. Please be careful here to look for significant things not just drag in anything and everything. Once you have made this list you may add to it, modify it or discard from it as you go along.

5c. Work out how you want to end the review - often this just sums up your point of view but you may have other ideas

5d. You may like to include some statistics if that is relevant. But don't let this run away with you and so the review just becomes some sort of justification based on statistics. Remember, statistics almost never tell us anything about the topic itself and only tell us things related to the relative importance of certain things we have identified.

Step 6. Literature Searching - Armed with your theme and list of elements start your search for suitable material but be very careful to record the exact details of where everything may be found and checked. The search may start with the Internet or a special tool like Google Scholar but must move on to respected publications.

Step 7. Structure - The final step is to structure your themed list of topics using headings, subheading, paragraphs, bullets, tables, diagrams and so on in order that we get a coherent and lucid discourse on your chosen subject area. This is not a trivial matter and you must expect to go over it many, many times before it is really an example of your very best work.

5.6.3 Reference and Bibliography

References are to primary sources that you use in the text of your written work. A bibliography is a list of sources you have identified as useful (including references) but not necessarily used. The University will look very carefully at any references to see if you are prepared for study at Master's level in your chosen topic area. Overall, the expectation is that you will list at least 10 sources. For each source you must consider its:

Currency – looks at publication date and be aware of changes in technology. In technology books are soon dated.

Completeness – Make sure you are looking at the final version not some draft or abstract.

Uniqueness – is the source a primary one

Coverage – Use your list of sub-topics to ensure that you cover all the areas required so that you are fully prepared. But make sure that you are not including multiple texts with essentially the same content.

Range – Make sure you have a good range of authors.

Authority – ask is the text authoritative. This can be done by considering the author, publisher, writing style and currency. It is also possible to use citation indexes to see how often the source has been used.

Accuracy – Is the information correct? If you cannot be sure then you must not use it.

Relevance – Make sure that your sources are relevant to your project topic.

Usage - The basic usage strategy is:

Find – Relevant texts using a library index, the internet, online book stores and so on.

Evaluate – Once you find a possible source you must evaluate it for content and relevance.

Contextualise – that is fit this new source into your personal knowledge base.

Cite – If you use a source it must be listed in your reference section and cited in the text correctly.

Discuss – You may include something from a source in your work as a copy (quote), paraphrase or summary but in all cases you must introduce it, comment on it at cite its source.

5.6.4 Evaluating Internet Resources

When using internet resources it pays to be careful and always sceptical because of the following factors:

Anarchy - anyone can publish just about anything on the Internet

Validation - authors do not always have their materials checked by an authoritative third party

Tendentious – when the author wants to convince you of something and will use any means to do it.

Honesty - authors may not always be what they seem and may assume personas, lie or make false claims

Consider – the motives of those who publishing on the Internet

Trust - in research trust nothing until you have good cause to do so. This is the opposite of what we do in our daily lives in that we tend to trust until we have reason not to.

Context – be aware of the context of what you find. For example is it a University site, is it a manufacturer and so on.

Accuracy – this simply means is the information correct. You need to be aware that information might be validly collected but still be quite inaccurate.

Validity – this means that we ask is this a valid source in the sense that it was constructed in a reliable manner. Any lack of information on proof readers, editors and publishers means that mistakes are more prevalent than in print and therefore increased scope for innocent error and for outright deception.

Authority – this means was the author competent to create this material. For example any one could have an interest in say Emotional Intelligence and quite easily create an internet article on that subject but it would not have the same authority as that of a University professor who has spent years researching the topic.

Uniqueness – here we are asking is this an original work (a primary source)

Completeness – this may simply be described as asking if the work is the final and finished version. You need to be very careful here else you might find yourself using the material from the earlier part of the work which in fact was augmented at a later stage.

Coverage – this means what is the scope of the source. Now this does not mean that a source will cover everything on a given topic but it should be clear as to what it is covering.

5.7 Citation Examples

The following set of examples is intended to show some often poor use of citations and also some sound ones. These examples should be studied with care so that the flaws they illustrate may be avoided. The quotes are from a range of sources and topics and in your study of them you need to concentrate on the form. Now assume all the following were all written by the Research Methods tutor so the comments will be offered in the first person as if he is talking to you

These are just simple examples and they do not imply you must use italic or indenting as that is only used here to show clearly the pieces of work being looked at.

Example 1.

Lyau & Pucel (1995) found a link between training and productivity for their sample of Taiwanese car part manufacturers. Bartel (1994) found that training is a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors. Bishop (1994) and Barron, Black & Lowenstein (1989) both found that training increases management estimates of productivity.

This is poor because I only told you what the cited authors said. I did not introduce the author's words, nor discuss them and it's almost impossible for you to see what point I am making other than the obvious one that productivity and training may be linked – in effect it is not my work at all and there certainly is no sense of evaluation here. We might have written

Many authors (Lyau & Pucel 1995, Bartel, 1994, Barron, Black and Lowenstein 1989) found a link between training and productivity and that training is often a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors ... followed by your comments/discussion/analysis etc

Example 2

It has been found that because Arabic words were written by copyists who did not use vowels that over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that it looks as if I attributed the entire paragraph to Noldeke. So you can have no idea which part of the paragraph was my own thought or maybe none of it was. This is bad practice and some tutors even regard it as blatant plagiarism. The fact is that tutors when they see this form in will automatically assume that all the student has done is paraphrase what he has found and none of it in effect is representative of any student thought and will mark the work down because of it. It could have been written as follows:

There has been a long standing problems with some early Arabic manuscripts in that many words have become obscure and even in context they are still unclear. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowel, over time the meaning of some words became lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use "assonance analysis" to study word endings and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes.

You can use the bracketed form if you just want what amounts to passing reference to a source as in the following example.

In two recent works (Harding 1986a, p.80; 1986b, p.138) it has been suggested that ...

Example 3

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that "change in organisations is an inevitable consequence of growth" – this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdal is clearly obvious and that by Briggs is common knowledge. Also it is not entirely clear that the second sentence leads logically from the first one. The point is that using citations here was unnecessary and therefore worthless. *We might have written.*

It is obvious change in organisations is an inevitable consequence of growth and in the modern world that must imply continuous IT progression and updating. Many authors, notably St Clair-Tisdall and Briggs have commented on how these naturally progressive elements may be factored usefully into a company overseas sales policy and....followed by your comments/discussion/analysis etc

Example 4

Suppose, in your reading you come across the following in a book by Noldeke. But the bit that interests you is by Frederickson – how will you set about properly using and referencing the Fredricksons quote?

Tools are needed if we are to measure software quality in a meaningful way. The idea of quality, as we know, is intangible since many views are possible. It follows that we must define some terms in order to measure quality. It is useful to note what Fredrickson said: "Definitions of what quantities we need to measure in order to assess software quality are at present arbitrary since as far as we know they have no connection with functionality".

This does not mean that they lack a rationale, but simply that professionals disagree on the definitions themselves and so it follows that

In this case the correct way is to find the Frederickson book and use that because it is the primary source. Quoting from secondary sources will only be tolerated in proven cases where the primary source cannot be found or for other reasons is inaccessible and it must be done in the correct manner as shown in Workbook 8 for secondary sources.

Example 5

Can you work out what the following extract from a piece of student work is saying?

It is argued that tacitness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

The sentences is obviously copied as it is very, very unlikely that any student would write with such academic complexity and obscurity – lines like this are not designed to communicate they are designed to impress the reader not further his understanding. What it in fact it is saying is that some skills are very difficult to duplicate and this may mean that growth may be restricted. We might have written.

Fahey in his 1989 monograph has stated what should be obvious but he nevertheless less shows conclusively that companies often do not realize that some skills are very difficult to duplicate and this may mean that growth may be restricted or if you like it's not all that easy to copy a skill. ... followed by your comments/discussion/analysis etc

5.8 Literature Reviewing Cautions

Writing a literature review is a difficult and time consuming task if it is to be done well and there are no short cuts to sound scholarly work so here are some final pointers.

Justification - A literature review is NOT a justification for your research idea and such a review will never be regarded as explaining to the reader the topic area and your evaluation of it. Justifications often take the form of filling up the review with statistics but such an approach carries no real value in convincing the reader that you are master of that topic area.

Structure - It is very common to see students write down things in a literature review as they occur to them. This practice might be fine for notes but it is obvious that the way thoughts pop into ones mind or information is discovered is often anything but logical or structured. To communicate in writing effectively you must impose some structure on what you write else readers will not be able to see any progression in your thought or in the topic.

Pretence - some students try to be scholarly and pack their work with quotations and paraphrases – this then become not an evaluative review of what was found but a recitation of it instead. It is correct and desirable to tell your readers what you have uncovered but unless you make comments and add your own views on what is found the work will be regarded as a worthless recitation.

Non Review - some students just write down what they know without any references to the literature – this will always lose you marks as no one will believe that you obtained that information by your own brainpower without any outside assistance.

Experience – students often claim that what they write is all down to experiences but again no one will accept that. The way you use experience is in your evaluation of the sources, comments on them and building up your own arguments.

Inclusion – Preparation of the mind for your topic area does not mean you write down everything you know that might be relevant. What it does mean is being focused on your topic area and becoming expert in that. For example, an Engineering project where the literature review contains page after page devoted to telling the reader about every conceivable life cycle is hopeless and in such cases there is almost no thought over what is written and so it is worthless. Similarly, if a study project was looking at eCommerce as a way of selling drugs then page after page telling us about various drugs, treatments and prescribing practices is worthless in the context of just selling drugs. It's not volume is wanted but considered content.

Common Knowledge and Obvious - Quoting or paraphrasing material that is either obvious or common knowledge implies that you have not looked at the sources beyond the first page or forward. Here is an example from a project document. "Poston (2000) stated that organisation expected ERP systems to deliver improved performance". This is worthless as it is obvious that they would want this and to say it makes no valuable point at all - its no good trying to say things like this as if Poston was enunciating some law of the Universe or a point of huge importance on some new and valuable angle related to ERP - no he is just stating the obvious.

Bad Citations Style - It is very common to see the citation form (Briggs, 2000) placed at the end of a sentence or paragraph. This can ONLY mean that all you have done is paraphrased, summarised or copied that section. This practice is more or less plagiarism and is representative of a very lazy attitude that assumes that just expressing something in your own words is a valuable contribution - its is not because YOU are saying nothing and what you are supplying is not really your own work at all.

Activity Definition - Some students use the Literature Review to tell us what they are going to do in the research. This will result in a zero mark as what is to be done is covered in the Research Design so repeating it here is valueless. This practice is a certain sign of laziness.

6. WORKBOOK 6 – MAJOR PROJECT ELEMENTS

This workbook is intended to help students formulate clear project elements but here that what is said here is a mechanical process and it is your responsibility to make sure that what is written down makes sense.

6.1 Scope and Scale

Scope and scale are meant to be considered carefully otherwise a project which is out of control and way beyond your capabilities in the time available may occur. Alternatively, the scope and scale may be set so that the problem becomes trivial and the idea is rejected. So please take note of what these terms mean as far as this course is concerned.

Scope – this means something like selection or choice. So for example, if I were looking at training in desk-top packages I might select just Excel or I might select Excel and Access and so on to focus on. The point is I set my scope by being selective.

Scale – the means something like number or extent. So for example if I set my scope as looking at Excel I now need to set the number of users I will include in my study.

Scope and scale are two dimensions that set a frame around your work to bring it into sharp focus and exclude everything else. You need to put limits on both these dimensions but it is most important is to be clear about scope – that is, what exactly to include in your study, normally, just include ONE significant thing.

6.2 Presenting Problem

In any project it is usual to choose an area of knowledge and practice to be its topical focus. For example, one might choose modern usability issues, automated network management, digital paper and so on. Once one has a topic area it is necessary to choose one problem theme within it to be a sharp focus for a primary data research effort whose aim is problem resolution or partial resolution leading to a strategic business IT significant benefit. In general, it is not all that easy to give a simple and all embracing definition of the notion of problem but the following has proved to be useful.

A problem or issue is something that is a matter of concern or debate within the topic area and whose resolution might bring benefits. (Checkland 2003)

In practice this means a problem is an object not an activity. For example, stating the problem as “how to ride a bicycle” is incorrect since this is a question about the problem - the problem is “riding a bicycle”.

Another difficulty is that students often write down the problem in such a way that it is an answer or solution to the problem. So for example, if one writes a problem statement as “lack of training” then implicitly that is a solution as well. When this happens it is almost certain that the writer is not thinking about the problem at all but is obsessed with a particular solution. In this particular case the real problem might have been “errors in data entry” and one of many possible solutions is training.

6.2.1 Problems are Rarely Simple

It is easy to become blasé about defining a problem and this is often compounded by our desire to get to a solution as quick as possible – therefore I urge you to take care and thoroughly analyse the problem. There are perhaps three elements that need to be understood.

Reduction – it is desirable to simplify problems but that may also mean that you oversimplify and so one ends up with a very inadequate problem definition or model and of course if you do that your solution may fail in part or even totally.

Context – every problem exists in a context of some kind and we often call it “the problem situation” and if you are to have any chance of an adequate understanding and definition of the problem you must appreciate the context in which it exists. To give a simple example, on this course writing an adequate Research Question is problematic for students because the ideas will be new, they are working full time, they have family commitments and so on – these things affect your ability to get this work done. But for me writing a Research Question is relatively easy, because my context is different: I have experience in this area, I am retired so no work pressures to contend with, I don't have to worry about failing and so on.

Perspective – everyone has a different perspective on any given problem. For example at work you may see a particular problem one way but your manager may see it in quite a different light. Now, we cannot help taking a perspective but we can be aware of it and try to moderate its affect on the way we define the problem.

6.2.2 Defining the Problem

It is a good idea to construct one's own definition of the problem and to do it in as few words as possible. Notice, that it is your own definition not one you might look up in a book or on the internet (though you might start with that) because there is often little learning value in just copying a definition as far as deepening your own understanding is concerned.

Remember, that any definition one constructs will not be absolute and accepted by everyone - but in research this is not a problem as long as the researcher makes it clear what particular definition is being taken. Do not take this process too far and end up with either over-complicated or trivial definitions - they must be thoughtful and comprehensive. So it is recommended you start by thinking about six things where the acronym CCC-APE (stated as "triple C APE") is used:

- Characteristics** – observable features or facets of the problem idea,
- Context** – every problem exists in a context of some kind and it must be understood
- Causes** – every problem will arise due to some causes or causes
- Associations** – every problem will have links to other situation elements,
- Perspective** – when a problem is encountered it will always be from a certain perspective
- Effects** – say what effects ensue in the real world if the problem is not resolved.

6.2.3 Defining the Problem - Example

Let us suppose that a student has identified the problem theme as Phishing. Naturally, the student will be concerned that this is a good idea and would like confirmation of that before expending time on it. One can ask the course tutor, but he/she is not expert in everything so at best one would only get an opinion as a response so how should a researcher proceed. So for Phishing a researcher might note the following:

Characteristics: illegal, intrusive, upsetting, preys on those who trust their fellow man, etc

Context – phishing may occur at home or at work and in both these situations one naturally feels comfortable and secure and our systems may be well protected. However, that context can lull one into trusting the messages we get and it is exactly that element that the fraudsters want to exploit

Cause – it seems the cause is to do with greed or wanting to harm someone and feel, rather sickeningly, pleased in being successful at it. Notice an interesting thing here – mostly knowing the cause helps you to solve the problem but here most would say it's insoluble but possibly preventable.

Associations: email, chat, file sharing, etc.

Perspective: management (but try to look at it from several perspectives as well)

Effects: destroys confidences in the system, may lead to personal or company losses etc

Normally, it takes quite a few attempts before a definition that is lucid and comprehensive is obtained. Remember, the definition must also be useful within your research study – that is, it's no good having a well formed definition that does not offer a sound basis for a research effort.

Now here is a first attempt

In the modern world email is a technology that almost everyone uses whether in the home, at work, on the move and indeed it seems to follow one around. Typically, email is a simple one-to-one message passing technology but it is now offered with enhancements that include voice, video, chat, file passing, file sharing where suppliers are attempting to present a complete communication environments. With such a technology come problems and one such problem is identity theft and one way of getting this is known as Phishing. In its simple form an unknown, but apparently authentic, source asks for personal details and then uses them for fraudulent purposes. The problem is identity theft using email systems where a message poses as a legitimate requestor in order to fool the recipient into thinking it is legitimate request. The problem in computer system is known as Phishing.

Here is a final attempt (but most often there are several intermediate attempts)

Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as legitimate request. The intention therefore is to fool the recipient into trusting the message and releasing information which can subsequently be used for fraudulent or other harmful purposes.

6.2.4 Cautions on Problem Definition

The acronym CCC-APE is just an aid to formulating a definition so one should not worry whether something is a characteristic or an effect - that does not matter very much because the whole idea is to uncover problem aspects and expand one's understanding of the problem theme.

As a very rough guide one often finds that the final definition must come down to about a third of what we start with. In most cases if one is familiar with the subject it is possible to create a good definition in about 1 to 2 hours and then if necessary update it as your project progresses as it is almost certain that there are elements that have been missed or imperfectly understood.

6.2.5 Problem Size

It is hard to measure the "size" of a problem because there is no scale on which to gauge it. But one can look at three aspects to get some idea.

Observable Effects – think about the effects of the existing problem and try to assess their seriousness in terms of the context in which it is set. In simple terms just ask "is it worth solving".

Causes – as was stated above, mostly knowing the cause helps you to solve the problem but some problems are so complex or so embedded in human nature that solution is impossible so in those cases we go for prevention.

Form of Answer – perhaps a better guide is to think about the form of answer and see how extensive, important and how hard it is to get. For example: one student wanted to deal with password overload – a clear problem with which we are all familiar but his outcome was a set of guidelines on how to construct good passwords but in my view that was a trivial answer to the problem because those guidelines can be found almost anywhere and it is doubtful if that goes anyway to solving the overload problem.

6.3 Project Target

When you think of a problem you normally do it in relation to its effects. It follows that you have to think very early in a project about what effects will be generated if you can resolve the problem – these real world effects are called the project target. Normally one settles on one major target although it is permissible to list more than one. Targets are effects so these are typically introduced by a verb form (increase, reduce, remove, reduce etc) and tend to be such things as: improved accuracy in data entry, to gain infrastructure resilience, streamlined workflow and so on.

6.4 Project Outcome

It is obvious that at the start of a project we do not have its outcome – but we can have some idea what its form may be. Therefore if we know our target we can speculate about what project outcome credibly might generate or go some way to generating the desirable target effects if used by situation actors. Outcomes are objects and so are typically expressed as nouns: Here are some examples:

The target of "improved accuracy in data entry" might be generated by a project outcome of a training needs assessment report or a training plan for use by departmental managers.

The target is "to gain infrastructure resilience" might be generated by a project outcome of a revised backbone design or a set of recommendations for new technology for use by the IT development team.

6.5 Situation Actors

Whenever you state an outcome you must always say who will use it (called the situation actors), how they will use it and hence show how the target effects are achieved. If you do not do this with care one often ends up with a worthless outcome because it is unusable or unsuitable.

6.6 Speculation

It is often useful when thinking about the solution to a problem theme to think of it as based around or generated by some personal theory a person holds about that problem and its setting. Essentially, one gets at this theory by speculating about causes and possible solutions routes. It is not easy to say how to speculate but it can be said that it is aided by a thorough literature review, personal experience and a deep consideration of the problem theme perceived in a given situation.

For example suppose the situation was related to issues with application software implementations in business not being as successful as expected. Recognition of this problem theme is a first step but if one is to do something about it, it might be useful to thoughtfully speculate on why success is lacking in this area. It follows that one might speculate that this lack of implementation success is due to poor implementation

strategies, or poor user training, or poor project management or any number of things. Notice that there will always be rival speculative ideas and that is why one must be thorough in looking at the literature and using your basic knowledge and experience to open up the problem situation in order to at least have a credible theory as to the most probable solution route otherwise one might just waste time on chasing nothing of value.

Do not let this idea run away – this is not about natural laws of the universe such as Ohms law or Archimedes Principle – here one tries to establish a personal belief about a situation and its problem theme. So after speculation one might express ones personal theory about the above example as follows.

It is believed that implementation of application software is proving difficult and this may be due to poor implementation strategies. It follows that if this is the case and better strategies can be defined then implementations may prove more useful in the future.

Notice that my theory points to a particular form of answer to this problem theme and in this case it is related to perhaps a document that explains how to formulate implementation strategies based on a consideration of user needs, application intention and business objectives. Occasionally, the theory may be embodied in a scientifically constructed hypothesis but more often than not in technological research it is expressed informally as an idea.

6.7 Primary Data

Primary Data is data is new data in the sense that it will not exist as a set until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data set is representative of some aspect of the area under investigation and can be processed to get a defined outcome that will resolve or partially resolve a stated problem theme when used by situation actors. All projects must be based on the collection and processing of primary data.

6.7.1 Primary Data Collection Protocol

Within every project there has to be a collection protocol for the practical collection of the primary data. Every complete protocol will have 5 features:

Vehicle – this is the primary mechanism or technique employed by the researcher, typical examples are: interview, questionnaire, observation, role playing, seminar, focus groups, document searching and so on

Recording Profile – this describes how the data will be physically recorded. Typically we might use: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria – this is a profile that allows the researcher to know that he/she has a valid sample point from which data is to be collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. If we do not have a profile we may not have any consistency in our data and it may therefore be meaningless.

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable in the sense that they cannot be ethically used.

6.7.2 Project Purpose in a Nutshell

Students sometimes get confused over what a Master's project is about. Consider a topic area like Digital Paper which is likely to be a very hot technology in 2008. A Master's project is not about producing a long narrative on Digital Paper explaining what it is, how it is used and what the technological infrastructure to support it might be. A Master's project is about identifying a problem theme in Digital Paper and then collecting and processing primary data into a form that helps you resolve that problem theme based on ones own personal theory. With this in mind, consider the following examples.

Example 1. Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them – is that primary data and is this a valid research purpose? No because in the first place one might just regard the manual as listing the functions anyway so in effect the data already exists, secondly, this is just one book and so its content might be complex, trivial or totally unrepresentative.

Example 2. So if I extract (my basic activity) instances of phishing (my problem theme) from an email log that would be primary data because even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data) as a set did not. My purpose being to process this collection of primary data to find out the most common sources of phishing and express my findings in an evaluatory report (my form of answer) to be used by my managers to eliminate or reduce successful phishing cases.

Example 3. If I conduct interviews in order to describe (my basic activity) a user purpose regarding illegal downloads (my problem theme) in my company with selected employees the interview transcripts are my raw primary data because the transcripts did not exist before the interviews took place. My purpose being to process this collection of primary data in order to develop a policy (my form of answer) to control illegal downloading activity for use by IT personnel in monitoring internet activity.

Example 4. If I look through written reports (secondary data) on security violations (my problem theme) for a particular company with a view to identifying (my basic activity) the root cause of each violation then even though the violation reports exist the list of root causes (my primary data) did not so it is primary data. My purpose being to process that collection of primary data to create a strategy (my form of answer) that will alleviate or remove certain kinds of violation in future when used by security managers.

Example 5. If I plan to build an application for processing student MSc marks (my problem theme) then I need to ascertain (my basic activity) the system requirements (my primary data). My purpose being to process this collection of primary data to create a design (my form of answer) for the marks processing system which can then be used by software developers to produce a working application.

6.7.3 Pre-processing Primary Raw Data

In many cases it will be necessary to process the raw data that one collects into a structured form of some kind so that is easier to use when generating the final project outcome. For example, if we have a series of interview transcripts it is obvious, that in that form, they are not easy to use so we might perform a pre-processing phase to get the core data into a more structured form that then constitutes our primary data set before the main processing phase that generates my project outcome is carried out. For example, suppose I examine company documents on misuse of IT system resources by employees. In this case I might proceed in two ways to get my structured primary data collection.

In line processing – that is I define my structure before I start and then as I come across a misuse example I structure it there and then. However, the disadvantage here is that you have to continually look back to see that you are not recoding the same data again and again from other incidents and so it tends to disrupt the collection process and make it longer to complete.

Pre-processing – here I wait until I have been through all the documents and then I use my set of notes to systematically work through the whole raw collection and form my structured collection that way.

6.8 Writing a Research Question (Study Projects)

This is intended to encapsulate your whole project idea and intention into one lucid question. Ideally one wants open questions that request information in the form of an answer. Questions can sometimes be like commands used to elicit a response and others such as "Would you pass the salt?" looks like a question but in fact is a request or action, not for an answer. In Research Methods, however we will only look for questions that elicit information.

The simplest questions implicitly or explicitly request information from a range (finite or infinite) of alternatives and these are often called bi-polar questions but more generally question ask for information that includes explanations, description and definitions. An interrogative word is a word used to start a question. All questions have a natural structure to them and that structure can change dramatically when you change the interrogative. In English the following is a list of interrogative words although some of them are rather old fashioned now.

Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.

6.8.1 Questions that are not Questions

It is often difficult to write something that in English could be taken as a question. Now I am sure that in daily life everyone knows how to ask a question but when you write something down you are entering another world. Consider the following two lines – would they be understood as proper questions?

How to sharpen a pencil? Or What a pencil can do for you as a student?

Now these clearly ask for information but if you spoke these fragments to someone they would not quite see it as a proper question – in English such fragments would be understood as a kind of heading to a list of instructions for sharpening a pencil or a list of the benefits of using a pencil. That is that they imply that someone is giving you an answer not a question.

6.8.2 Basic Research Question Forms

It is best when attempting to construct a question to think about what sort of answer to expect – now in normal everyday life we do this instinctively. For example, you would not say “is this the right way to Pablo’s restaurant” if you wanted actual directions because that question form could only give you a Y/N answer. Instead you would probably say something like “how do I get to Pablo’s restaurant from here” and reasonably then you would expect an explanation. Broadly speaking there are four sorts of answer:

Bi-polar answers - Essentially questions that imply a limited range of possible answers. Typically, a bi-polar question starts with a word such as WHAT, IS, CAN or DOES.

- Is it possible to sharpen this pencil? (Y/N)
- Does it make sense to allow children to sharpen pencils (Y/N)
- Can a blue pencil be sharpened easily (Y/N)
- What is the common view of staff about using blue pencils? (Disagree, agree, etc)

Bi-polar questions can of course be useful but more often that not they have no great utility with forms such as “Can a green pencil be used in place of a red one?” Well of course it “can” be used so the answer is bound to be YES and so the question is pointless.

Explanatory answers – where the expected answer is an explanation and it is often in the form of a procedure or process. Typically, explanatory questions start with ‘HOW’ or ‘WHY’. For example, “How can a pencil be sharpened safely by young children?”

Descriptive answers – where the expected form of answer is a description most often in the form of an evaluation. Typically, these questions start with WHAT or WHY. For example, “What is the purpose of HB0 pencils?” (a simple explanation) or “Why are HB0 pencils difficult to sharpen?” (an evaluation)

Exploratory answers – where the expected form of answer implies an exploration of something. Typically, exploratory questions start with HOW or WHY. For example, “How should we use HB1 pencils best in drawing figures?” (often an exploration leads to an explanation)

The most common interrogative words to start questions are: what, where, would, in what way, can, is it, why, which, where, how, does, who, why and do – whatever word you use, always ask what form of answer is implied by each of them. You must be sure that whatever form you decide on as answer that you can actually construct it and when it is constructed as part of your research it is in fact useful strategically in some way.

For example, suppose I decide that the form of answer I want is “The role of technological innovation is business success”. The task you now have is to ask yourself whether you know how to express a role (write it down if you like) and whether knowing about this role will be of any use.

6.8.3 Research Question – Why are we asking it?

In normal everyday life questions come at us more or less all the time. Sometime we just answer them but more often that not we have a tendency to ask “why do you want to know”? It is therefore always useful when setting out your research question to ask why you asking it. That is you say to yourself, if I have the answer to this question then there will be some good outcome because of it. Sometimes we embed in our questions why we are asking them but mostly we do not. You will see later however, that you will have to make the reason plain in the aim so one might as well think it through at the question stage as well.

6.8.4 Research Question Form of Answer

For any Research Question there will always be several possible forms of answer arising out of ones personal theory about a problem situation encapsulated in the question. Ideally one would like the research question to be worded so that ONLY one form answer is possible and that is the one our theory suggested but often that is not easy to do so one normally has a range of options and competing theories to choose from so one looks for a form that interests you or looks to have the most utility. Do not be tempted to have multiple questions all in one sentence or look for multiple answers since it is better to focus on one significant output form. Table 4 lists the main forms of answer to help you when considering your personal theory.

Category	Typical Interrogatives	Expected Forms
Bi-polar	does, is, are, what, when or can	A list of possibilities
Explanations	how, why, who or where	A report, a model, an equation, a theory, a design, an evaluation etc
Explorations	How, who or what	A list, explanation, a comparison matrix, a pattern, a survey report, a theory etc
Descriptions	What, who or why	A report, a process or procedure, a model, a policy, a strategy, a theory etc
Table 3. Research Question Outcome Possibilities		

6.8.5 Strategy for formulating a Research Question

There is no easy way to do this and no real templates for it either so a good formulation will require some clear thinking and effort and that will show the examiners whether you are at Master's level or not in your thinking skills. A typical structure that you might use can be remembered by using the acronym IO-APTS. Therefore the IO-APTS elements are:

Interrogative – what is your key interrogative word (how, why, what etc). You should note that some interrogatives need to use two words if a proper question is to be formed. For example, “how” on its own will not normally make a question but when you say “how can” it is clearly a question.

Outcome – here one asks what sort of answer and what form it might take. Answers might be yes/no, an explanation, an exploration, a description which may be expressed at the end of the project as a report, a model, a list and so on.

Actor – the person or persons who take the outcome and use it to get the target effects

Problem – focusing on a single significant problem and be as concise as you can.

Target – what effects will be observable and measurable in the real world if you can resolve the problem. Effects are things such as efficiency gains, provide or enable better communication, increased accuracy and so on.

Spotlight – put the spotlight on where the primary data or information needed to answer the question might help come from.

Generally, the Research Question should ask always about the outcome and who will use it to solve the problem to get the target effects. However, the order in which the question features go in the sentence is largely governed by the interrogative used. It follows that it is possible to write the question in several ways depending on the interrogative used. The interrogative “what” is often used and then a good question seems to use the features in the order: Interrogative, outcome, actors, problem, target and spotlight. Here is a student work example:

What (**interrogative**) portfolio of accounting best practices (**outcome**) can be identified for use by junior personnel (**actors**) to avoid billing delays (**problem**) in order to improve the quality of response to customers (**target**) based on an examination of the initial accounting processes stages (**spotlight**)?

I used “what” here because I am looking for a process and this interrogative seem very appropriate for that kind of outcome form. Depending in what we want we might end up with a different interrogative and a different question format. Suppose we did not want to find the best practices but just explain why the current ones do not work then we might write the following but as you can see we get a slightly awkward sort of construction when we try to add the outcome and the actors.

Why (**interrogative**) is the current portfolio of accounting best practices (**spotlight**) as used by junior personnel creating long billing delays and poor quality customer response, (**problem**) expressed as an evaluation report (**outcome**) for use by application consultants (**actors**) to ensure there is an informed (**target**) management personnel on possible process changes.

Whatever interrogative you use you must always fit in the 6 features to make it comprehensive and this will often require a little ingenuity. One very common error that you must guard against is asking how the outcome can be used because in most cases it is obvious. To use a trivial example, one often sees questions that say things like “How can I use my training as a driver to drive a car?”

6.8.6 Meaning in a Research Question

This section has looked at the structure of a typical Research Question but it MUST be thought out step by step and even then one has to think does it make any sense, is it a focused question, what sort of answer should I expect and so on – there is simply no substitute for careful thinking.

Once you have formulated your research question and have a good idea what form the answer will take then its time to test it using the following ideas. Now be aware that this is just a test of structure and of itself it does not mean the question makes sense – there is no way to do that other than using your own brainpower and common sense – if it makes sense to you it will probably make sense to whoever else looks at it.

English – does it read correctly in English as a question?

Paraphrase – if it's a good question you may be able to ask it in several different ways – so try to do that until you get a formulation, perhaps with a different interrogative, until you are happy with.

Bi-polar – this means that the question has a fixed and limited range of answers such as “Y/N”, “bad”, “good”, and “excellent”. This type of question can of course be useful but the problem with them is that such answers do not have much utility – that is they do not tell you anything of value in terms of what action or actions you might take. You are advised to avoid such questions for your project.

Discussion – look at your question and honestly ask ‘will this question produce discussion?’ – what this means is to ask ‘who am I writing this question for and would it interest them’. Try not to think that you are doing this for your Research Methods tutor but try to think what you would do if you were trying to get funding for research to get an answer to the question from someone.

Answer Form – try to work out what form or forms the answer will take (typically: bi-polar, explanation, description or an exploration) – if you try to avoid this aspect you may find yourself in serious trouble with your research.

6.8.7 Common Errors in Research Questions

The following are typical errors found in student written Research Questions – they can all be avoided if one takes just a minute to think through what has been asked and what sort of answer is likely.

Not a Question - to an English speaker the following would not sound like a question, instead it would sound like a heading to a list of instructions or a procedure. "How to make business application development productive at XYZ Corporation?"

Multiple Questions – It is never a good idea to try to put TWO (or more) questions into one as in the following example - one is about testing and one is about bugs they are quite different things. "How can software bugs be minimised and the testing cycle shortened in the development process of an Inventory System?"

Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example below and it is easy to see that the answer to the question is bound to be YES - of course a productive work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this. Similarly, it is easy to explain how a better development process can increase productivity.

"How can a better business application development process increase the productivity at XYZ?" or

"Can a productive work-life balance be achieved with telecommuting for technical personnel?"

No clarity about each IO-APTS feature - I would recommend that you add in brackets the 6 feature names as I have done above when you write your question.

Each IO-APTS feature occurs once - this is important because it's again all about being clear what each feature is and helping the reader understand what it is you have written.

IO-APTS features in some cases may be combined - you may do this if the question sounds more natural to you but be careful that you really do know what each feature is.

Confusion with target and problem - this is often caused because a student gets muddled up about the effects wanted and what the actual problem is. Again when we see this it makes us wonder if you have understood the very basis of your own project idea.

Confusion over target and outcome – this is perhaps the most serious error and it would imply that you do not understand the most basic distinction.

Please remember that it is possible to write a very poor question that exhibits more than just one error type and yet has all the required features - there is simply no substitute for thinking about what it is you have written.

6.9 Primary Data Generation with Activity and Spotlight

Based on a problem theme, theory and the form of the project outcome expected one needs to formulate a process to create a structured collection of primary data. There is no algorithm for doing this and one has to go carefully through the steps: define the data, locate the data and decide on a protocol to collect that data reliably.

Activity – this is also known as a Basic Activity for Generating Data (BAGeD). All it means is that one has to do something (an activity) to get the data and these activities must inform you how to write down the data. Possible activities might be: account for, collate, assess, profile, illustrate and so on. Notice that activities like “interview” are of no value here because they don’t tell us what to do with the data. That is we can say “profile the inventory management staff” because it tells us what to record as data (profiles) but although we can say “interview the inventory management staff” we now have no idea what data we are looking for.

It is an idea if the activity is just one verb and list of useful verbs can be found in Workbook 16. One needs to be careful here that the activity is clear since almost all verbs need to be qualified or supported by stating their object. For example, if I were to say, “look at fault logs for my primary data” then that is very indistinct because it does not tell us what to look for (the object of the looking). But if I say, “look at fault logs to describe instances of SPAM attacks” then I now have a more distinct activity because I know what I am going to write down as my primary data. The whole primary data collection process is then fitted around that basic activity and the spotlight described below.

Primary Data Spotlight - The core of this primary data generation process is to find an activity which we can use to extract data and coupled with that we must have a primary data spotlight (usually we just say spotlight) that is focused and illuminates just the primary data that you want.

As an example, suppose the problem theme is the value of IT training. Clearly a lot of money is spent on training so it might be really useful to know if there is a link between it and productivity. Suppose we speculate that the link is to do with essential business working practices and these change over time to meet new needs so that what I need is an outcome in the form of a process model on how one identifies changes in business essential working practices and links them to a training initiative.

Now that I have my outcome as a process model the activity (BAGeD) can become **describe changes in essential working practices** of key operational staff – thus, my activity is “**describe**” and the primary data spotlight will be **changes in essential working practices**. Now that I have this core activity and spotlight I can work out the full process of getting to the data and processing the resultant collection to get my process model (outcome) that describes the link between business essential working practices and training.

Once the activity and spotlight are clear it is an easy step to say how that data will be collected. In the above example I might use interviews with relevant staff. In summary the whole process becomes **describe** (activity) **changes in essential working practices** (spotlight) using **interviewing** (collection protocol) with relevant staff.

6.10 Getting an Activity and Primary Data Spotlight

This can be quite hard to do but it is essential to find this activity and spotlight. So we are looking for an activity and we hope that activity can be used with the spotlighted data. There are only three real considerations:

Problem Area Expertise – it is obvious that you need to have gained expert knowledge in the topic area and in the particular aspect related to the problem theme you are dealing with. Unless you have thoroughly prepared by using literature reviews and/or other means you will simply not be in a position to know enough to be able to decide competently what data it is possible to collect.

Intended Outcome – fix in your mind that you are trying to generate as an outcome and recall that whatever primary data you collect will be first formed into a structured collection during the pre-processing phase, which follows immediately after collection, and then that structured collection will be used to generate, in some defined manner, your outcome.

Let us suppose the outcome is to be a set of guidelines, so you have to think what sort of primary data is needed to be able to generate the guidelines and that might be to look at current practices. Once we have the data on current practices we can move on to finding out how to generate guidelines from that data. This means you must know what a guideline is and how one is constructed and that is where secondary data comes in. So in this case you might look at text books or journal articles to find a guideline model to use. Additionally, you would look at examples as well as look at any relevant company or international standards.

Collection Protocol – the last thing to consider is can the primary data be collected and if it so, what is the best way to do that. So it's not a matter of just choosing anything that comes to hand, it is a serious practical consideration based on a thorough and logical analysis of the sort of primary data that you want.

In the guidelines example above, the idea might be to use a questionnaire and one has to ask would a questionnaire allow for the collection of the data I needed. Let us suppose that the data we spotlight is related to finding guidelines for IT media and usage. Now a questionnaire can easily get media data but it is not clear how it could capture usage data so I might decide to get that information by interview instead because I want a richer picture there - guidelines are largely about usage so that is where I must direct my effort.

To elaborate, usage is a complex issue and if you try to get it with a questionnaire you must have a very good idea what the usage processes are otherwise you may miss lots of things that are going on in the company setting. Whereas, if I use an interview, I have much more opportunity to explore the usage idea and that is what I really want.

6.11 Problem, Outcome, Activity and Spotlight Examples

Consider the following further examples which focus on the activity and data spotlight and its link with some theorising or speculation about an expected project outcome. In each case several possible outcomes are listed but in a research study only one would be chosen for further work.

One needs to be careful – this all sounds fine, even simple but a researcher must seriously consider if a complete process built around the activity and spotlight can be formulated in order to get at the necessary primary data within the time and other resources that are available.

Problem - Loss of competitiveness in Hong Kong SMEs

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A list and description of investment constraints or
- A strategy to deal with the investment constraints or
- A feasibility report on e-application implementation or
- A post implementation review report or
- A prediction reacted to the effects of the constraints

Let us suppose that I choose a list and description as my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on reviewing (activity) investment plans and the corresponding strategic plan in order to describe (spotlight) an investment constraint (Generated Primary Data). So my primary data will consist of a list of identified and defined investment constraints.

Problem – Data losses associated with non-effective IT business systems

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A process of data criticality categorisations or
- A user guide to data criticality or
- A DRP/BCP policy document or
- A report explaining how data and criticality are related

Let us suppose that I choose a DRP/BCP policy document my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on listing data categories and using these categories I review reported critical incidents related to data categories (spotlight) in order to match (activity) the category to the criticality of the incident (Generated Primary Data). So my primary data will consist of a list of categorised critical incidents.

Problem - Supplies continuity in manufacturing systems

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A evaluation of a modern supply change process or
- A feasibility report on RFID or
- An implementation plan for RFID or
- A model that shows how improvements may be made using RFID

Let us suppose that I choose to list and describe expected benefits of RFID as my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on describing (activity) supply chain (spotlight) tracking problems (generated primary data) and by a process of evaluation of each problem theme I suggest how it might be alleviated by RFID and hence an implied supply chain benefit. So my primary data will consist of a list of categorised problem themes in supply chain tracking.

Problem - Business productivity in sales staff

This might be resolved by any of the following outcomes if used by an appropriate situation actor.

- A feasibility study on IM and its use in offices or
- The definition of a training programme or
- A series of factors that must be in place before IM adoption or
- A cost/benefits report on Instant Messaging Technologies or
- The design of a regular monitoring scheme to assess effectiveness

Let us suppose that I choose a cost/benefit report as my project outcome. Now I have to find a way of getting at the data I need – activity and spotlight. So I decide to focus on analysing (activity) call content (spotlight) to identify the sort or calls and then extract the cost (generated primary data) and assess the sales benefit and by process of evaluation arrive at my cost/benefit report on IM technology. So my primary data will consist of a list of calls and their associated cost and sales benefit.

6.12 Writing an Hypothesis

Hypotheses are not always needed but if used they must match your research question and amounts to you saying what you think to be true in a given situation. When you do this your work then become a process whereby you try to show that your hypothesis is valid. There are three stages: firstly write the null hypothesis, secondly write the alternative hypothesis and lastly write down the dependant and independent variables. Unfortunately many new researchers seem unable to do the last part of this process. Let me illustrate.

A student wanted to write a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (Dependent). Now this will ONLY makes sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified.

In research people tend to treat the idea of hypothesis in two ways and the second way is often quite valuable in many research situations.

6.12.1 Formal Experiment

To set up a formal experiment one creates or identifies two samples: one exposed to some effect and one not. For example, suppose I were looking at whether a new diet called lose-weight-quick worked or not. I could set it up a hypothesis and look for samples where some people were exposed to the new diet and some were who were not. The experiment then amounts to seeing if there is any significant difference between these two samples. (See CN.001 Notes for how to set up a formal hypothesis)

In a sense we are trying to prove the diet works but that notion of proof needs very careful understanding. The point is that it is very likely that the diet will work for some in the sample and not for others. So our proof carries a qualification which is that all we could reasonably say at the end is that the diet is likely to work for a large number of people (or not as the case may be). A second point is that we do not usually do thousands of

similar experiments and so at best our results for a limited sample would be tentative. Notice that this outcome is quite different from an experiment that sets out to verify a natural law like Archimedes principle or Ohms law where the amount of variety is much, much less and of course such natural laws have been tested many thousands of times so we are assured of their validity.

Strictly, proof means that something is true for everyone, for all time and everywhere and it is obvious that that kind of proof is very hard to construct in technology. What we therefore tend to do is not to use the word proof but rather say that our research “indicates” that something is generally true. So for example, it is impossible to prove (for everyone, everywhere and for all time) that CRM system bring productivity benefits at low cost but our research might be able to indicate that this is often the case for those who use it.

6.12.2 Informal Idea

Instead of using a formal null hypothesis we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies, surveys, quasi-experiments and so on to demonstrate this. Notice that we are NOT proving anything here only suggesting that something may be generally true within certain parameters.

6.13 Writing an Aim and Objectives

For each project we want one overall aim and a set of objectives that collectively will generate the project outcome. An aim/objective is expressed as an activity to get a defined and measurable outcome within the scope of the project. The essential difference is that the aim expresses the target (or purpose) for the whole project outcome whilst objectives generate minor project outcomes that collectively allow us to eventually generate the project outcome and hence achieve the target.

6.13.1 Project Aim

This derives from the Research Question and is best thought of as expressing the overall activity and intention of the project to generate an outcome that can be placed in the project document or made easily visible to the examiners.

You will note in the aim structure that follows that the problem theme is not usually explicitly mentioned and we infer what it is by looking at the target. The reason it is not included explicitly is that when one does one tends to get very awkward constructions linking problem and target so we might see absurdities such as “to improve website accessibility because web site accessibility is problematic”.

The most common aim structure is as follows where project outcome is its most essential part because this is what the whole project effort is intended to generate. The structure can be remembered by using the acronym AOST.

Activity – what principal activity will be used with the available data to get the project outcome? Ideally, look for a single activity that sums up the whole project process for generating the intended outcome.

Outcome – this element says how the project outcome will be expressed knowing that this outcome will later be used to generate the real world target. What ever you say here **MUST** match with whatever outcome you state everywhere else in your specification.

Spotlight – where will the basic data used by the activity come from?

Target – what is the real world intention? That is the project outcome should be useful in the sense that it addresses the real world problem theme on which the project is based.

Aim – to create (**activity**) a website structure design (**outcome**) using cascading style sheets (**spotlight**) in order that it might be used in design to improve web site accessibility (**target**).

Sample Faulty Aim 1 – “To create an improved network infrastructure”. This is unsatisfactory because we have no target - we know that there will be an improved infrastructure but we don't know what effects that will have. So is improved infrastructure the outcome – it cannot be because it would imply sending to Portsmouth for marking some object called “improved infrastructure” and that is an absurdity. So here we have no target and no outcome and we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

So if I just use the above example it would be possible to have a target of a reduced network down time because of the Improved network infrastructure but that could **ONLY** happen after the project completes and in the project one could generate an infrastructure design - now that can be completed within the

project period and later used to build the infrastructure which can then be used to generate our reduced network down time. Another factor here is that we cannot measure whether something called improved network infrastructure (what scale would we use?) has been achieved unless we have a target such as reduced down time which of course we can measure.

Sample Faulty Aim 2 – “To build a Wi-Fi implementation strategy”. This is unsatisfactory because although we know the project outcome is an implementation strategy we do not know what value it has in the real world because we have no target. Notice also we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

6.13.2 Project Objectives

The aim expresses the project outcome but to get there we normally have to pass through a number of minor outcome milestones on the way and these are expressed as being generated by objectives. Since we are looking for minor project outcomes milestones that collectively deliver the project outcome we have a little problem here because any project is made up of a series of tasks from generating page footer to evaluating the project outcome. It follows that some tasks will generate a minor project outcome and some will not.

Objectives are not the same as making a project plan because they are ONLY concerned with activities that generate a minor project outcome - a schedule of interviews is a project activity but that schedule can hardly be regarded as a project outcome, it is just a step along the way to getting the primary data – so one might add that into the project plan but it would not be written as objective.

The structure and features expected in a well-written objective are as follows where you can use the acronym AMSB.

Activity – Ideally we look for the principal activity that will generate a minor project outcome that can be expressed in a form that can appear in the project document.

Milestone – in this feature you state the milestone as a minor outcome, knowing that it must be in a form that can be written into the project document and represent a sequential step building toward getting the final project outcome.

Spotlight – what is the data area focus of the objective's activity?

Bounded - objective outcomes must be achieved and available within the project period and must not refer to anything that might occur after the project document is completed and submitted

Example – To explore (**activity**) and model (**milestone**) the current software development process (**spotlight**).

This is **bounded** because we can do it within the project period and it is also a **milestone** (building block if you like) leading to my project outcome of a best practice portfolio in software construction.

It is easy to become completely muddled with objectives and one source of this muddle is the distinction between a project objective: something that a student can do and evidence in the project document and operational ones: something that has a real world effect that might happen after the project has been completed. In simple terms if you set an objective in your project it must be completed within the project time scale. Let us just take an aim and look at some possible objectives.

Aim = To survey (**activity**) workers in Southampton (**spotlight**) and report (**outcome**) on how they use the bicycle as an aid to mobility (**target**) in a modern urban environment.

Sample Objective 1 – “To identify and list (**activity**) in a report (**milestone**) the components of a modern bicycle (**spotlight**)”. This is fine since clearly it is something that you can do, evidence in a project document so somebody else could check what you have done and it is clearly bounded.

Sample Objective 2 – “To describe (**activity**) how a bicycle functions”. This is no good since although it is clear that you can develop a description, no one can check it unless you write it down and it is not clear where we would look for the data. Better to say “To describe (**activity**) by means of annotated diagrams (**milestone**) how a bicycle functions by observing it in use (**spotlight**)”

Sample Objective 3 – “To understand (**activity**) how a bicycle helps urban workers (**spotlight**)”. This is no good because there is no clear spotlight so there is nothing to focus ones understanding on and even if

there were no one else can check your understanding because there is no milestone. Better to say, "To prepare (activity) a report (milestone) explaining how urban workers could be helped by the use of a bicycle in their daily lives by examining typical patterns of mobility for office workers in Southampton".

Sample Objective 4 - "To ensure (activity) that workers get to their office on time by using a bicycle". This is no good because there is no way anyone could do this activity and if you cannot do it no one can check what you have done. It also sounds more like an aim than an objective because it hints at a target. Better to say "To report (activity) on bicycle usage strategies (milestone) that might be applied by urban workers to ensure they get to work on time by identifying and observing regular cyclist's usage profiles".

Sample Objective 5 - "To implement (activity) a bicycle repair system". This is no good because although it is obvious you can do it, it cannot be checked in your project document because it is an operational activity and not a milestone that can be documented. But you could say "To produce (activity) a design document (milestone) for the creation of a bicycle repair centre by examining manufactures basic requirements for business applications of this nature (spotlight)".

Sample Objective 6 - "To ensure (activity) that bicycles conform to BS 7898 (spotlight)". This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written "To evaluate (activity) and report on infrastructures (milestone) necessary to achieve BS 7898 compliance requirements (spotlight)".

6.14 Writing a Title

The title is the name of your project – rather like the name of a novel, something that catches a potential reader's attention but just gives a hint as to what the work is all about. Think of it as a kind of nickname or slogan for your project and as such it is not a good idea to try to use the same set of words for the title, Research Question and aim. Titles typically have two elements:

Aspect – this is the particular focused area of you study

Why – this says why it might be a useful aspect

Mentioning the means by which you solved your problem should only be included in the title if it is crucially important. As an example, suppose your project was concerned with the development of a database and you used Microsoft Access. Unless your project compared your product with a similar database implemented in Oracle, say, then the tool you used to solve the problem is not as important as the problem you set out to solve.

Be careful with titles, there is a tendency to use the title to say what you will do. The purpose of the title is to give a concise name to what you do. Avoid noise words or phrases such as: "A report into..." (redundant: of course it is a report!) or words like "study", "investigation", "enquiry" and "development" are often similarly just noise. It is also usually very unwise to express the title of your project as a question although a title in the form of a proposition is often quite useful as in example 1 below. Here are some examples of good titles:

Planar Similarity – A Possible Software Quality Measure
Heuristics in the Stages of Soft Systems Methodology
A Taxonomy of Heuristic Problem Solving

7. WORKBOOK 7 – BASIC RESEARCH METHODS CHECKLIST

The work book is all about being able to select a research/problem solving method that fits the sort of research study you are engaged in. In every case you will have to decide what data you want to collect and choose rationally a research method (problem solving method if you like) as your primary research vehicle and build a research design around it.

You need to exercise care here so as not to become confused between a Research Method, which is a framework or model for the whole research project such as survey or action research, and Data Collection Protocols, which are vehicles for actually collecting the primary data and might include such things as interview, observation, questionnaire, seminar or role playing. However, before looking at these research models it is useful to just review basic research styles and approaches.

7.1 Research Styles

This is a practical notion and you would be wise to think project ideas through in terms of these styles. There is no sense that one or other is superior and no reason why both should not be applied at the same time.

Quantitative – a style that represents information in numerical form. The numerical form might be graphs and statistics which can be used to show trends, comparison and similarities and the graphs might lead to equations which link variables or allow one to make generalisations.

The advantage of quantitative data is that there is solid evidence that can be permuted in a variety of ways to support or not support a contention. In general, one is counting the frequency of some event – say the number of times the user selects the wrong icon but, and it's a big but, the data is only truly valid in the context in which it was collected so one needs extreme care if we want to generalise.

Qualitative – a style typically used to analyse how certain actions occur not just how often they occur. The information is usually represented in textual form of some kind as a description of some observable event or events. The usefulness of this is that it exposes the thought processes or reasoning behind a particular behaviour – why a user clicked the wrong icon. However, it does make the analysis and representation of the data more complex.

Although these are defined, in practice one does not usually start by thinking about the style and typically as you think about the problem and what primary data your research will collect to deal with it then it tends to define itself as predominantly quantitative or qualitative.

7.2 Research Approaches

There are two broad approaches to research, which is always essentially exploratory. In practice you do not decide the approach as such and it will effectively be decided for you when you formulate your research problem and construct your research design. However, we may loosely define:

Deduction - This means inferring particular instances from a general law. So if for example we use Ohm's law to predict with certainty the value of current if we know the resistance and voltage applied to a circuit. In technology I might want to look at the significance of scripting languages on system development time. I could do this by setting up a null hypothesis that says 'I contend that the use of scripting languages have no effect on system development time' so in effect I am suggesting a law here.

Inductive - This means the inference of a general law from the observations of particular instances. For example, you notice something that happens and see that it happens often. It follows that you can infer a general law from your observations. For example, you notice that people in your company tend to be more productive after IT training so you then make a generalisation using induction and say "training in IT leads to personal productivity increase".

It is very important you understand that nothing has been proved here and all you have is an indication. It is not a proof because we cannot know what new tasks or technologies might occur in the future. One of the greatest modern philosophers, Popper, put it like this. "you can never accurately predict the future because it is impossible for men to know now what they, or others men, will know in the future". It follows that we are never possessed of the data that can allow us to make certain predictions about what may lie over the horizon based on our current stock of knowledge.

In research we might think along either of these lines so for example we often set a hypothesis (a guess at general law) and then try to prove it. Alternatively we can go and collect data and by looking at the data see if we can work out what the law involved might be.

There is no right/wrong approach and it's a matter for you to consider what sort of outlook you are taking although in technology we tend to take an inductive attitude. It may sound simple and often no matter what our stance we end up collecting the same data but it will not always be simple – supposed you were looking at the effects of system migration in a rapidly expanding company and project control methods then it is not obvious what the link between these two things might be so a deductive stance would be unsuitable here.

7.3 Research Outlook

Before we look at the various research methods it is useful just to records that there are two outlooks that are available to a researchers.

Hypothesis Driven – this is the classical research paradigm where we have by some means devised a theory or speculation of some kind and the research is then directed at trying to show that the theory or speculation is valid. For example, we might theorise about who buys Gel Pens and then try to show that it is true, or more usefully try to explain in a report why it is true

Data Driven – it often happens that when we embark on research we don't have a hypothesis which we are setting out to test. This is very common today where corporations have vast databases and want to see if there is anything useful in them that might for example lead to competitive advantage. It follows, that in these cases we don't start with a hypothesis but we examine the data sets looking for patterns or outliers or indeed anything that might allow us to formulate a theory of some kind. For example, we might look through millions of sales transactions and then to hypothesise that people who buy Gel Pens all have beards and wear dark glasses. If this theory is true we can better target our Gel Pen products.

7.4 Which Research/Problem Method to Use?

There are many methods/models that we use for setting up research, the most common being: case studies, vignettes, action research, experiments, surveys, biographies/histories, grounded theory, ethnography and requirements gathering. It is never easy to decide on a method or perhaps more than one method.

Usually in research we do such things as: understand, explore, describe, explain, illustrate, improve, build something or prove something. It is therefore very important when you are trying to decide on a method to keep this basic purpose uppermost in your mind.

Choosing a research/problem method will depend on many factors such as: context, available literature base, basic research purpose, is the domain changing rapidly, time available, skill available, sampling and other practicalities, access, your personal stylistic inclinations, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on. Notice these factors are almost all about practicalities - a design has to be used and that means it has to be practical.

7.5 Rationale: Case Studies

The case study method focuses on just one, two or twenty examples – such as your place of work, or one element of your organization or several aspects of a problem area. Typically:

1. Case studies are commonly used to **illustrate** or **understand** a problem or **indicate** good practice.
2. Case studies always have a context so make sure you are aware of it.
3. Case studies are usually qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain or describe some activity or phenomena.
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. There are broadly speaking two ways to begin case studies. This first is that you can set criteria and then go looking for relevant cases or secondly you can design and create the cases.
7. For most case studies there is usually be a longitudinal element - that is the cases will run over a fixed time period and you will periodically visit each case to collect the data.
8. There are several kinds of case possible:

Unique – implying that the setting and context are extremely rare and there may not be another chance to study this problem area again.

Critical – implies an important theory that you want to test and a particular case fits that profile.

Representative – implies that the case profile represents a typical or everyday situation.

Revelatory – implies that the case profile allows a researcher to study a situation never before looked at in detail and its context may be common.

9. In practice you can use the following to organise your cases but remember once you have your case design you will need permission from whoever is necessary.

How many cases – be practical because there are time limits.

Case Criteria - add as many criteria as you think necessary to pin down the data location but don't have so many that you will never find a case that fits.

Sample criteria (collection protocol) – add as many criteria as you need to pin down a particular sample point where a unit of data can be obtained.

Visit Frequency - each case must be visited to get the data so work this out by looking at how much total time is available for the study.

Data collection Vehicle – by observation, interview, document analysis, etc. You will have to have a protocol to say when a valid sample arrives.

7.6 Rationale: Vignettes

These are perhaps best thought of as micro case studies or snapshots that illustrate just one idea and almost always are qualitative in their application. Typically:

1. Vignettes are commonly used to in research contexts where actions, motives and judgements are to be explored, often in sensitive situations and you want to extract and **describe** examples or **illustrations** of significant elements in that problem domain
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain, test and idea or describe some activity or phenomena.
5. Typically you cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept. Therefore, this may also be useful when only a small sample is possible.

7.7 Rationale: Action Research

The main purpose of action research is to improve identified practice in some way. Typically:

1. Action research is commonly used to conduct research at the workplace with a strong desire to **improving** aspects of your own or colleagues' work so
2. In this kind of research you must be in control of events and they must be contemporary.
3. Typically indicated as useful when the research question starts with 'how' and there is a desire to explain something and use that explanation to improve practice.
4. Because of its setting, it is obvious that the research design is linked closely to its context.
5. The whole point of doing action research is the research leads to change in practice.
6. The working strategy is: plan something, do something, observe the something and reflect on what has happened as a result of your actions.

7.8 Rationale: Experiments

This form of research is used where there is a hypothesis and an associated variable that you can control (the independent variable) that will produce a change in some other variable (the dependent variable). That is the whole idea implies that you can intervene by altering or controlling the independent variable. Typically:

1. Experiments are commonly used when you want to **prove** or at least **indicate** that something is true. In practice proof is very difficult as it would imply that you findings are true for everyone, everywhere and for all time and so then tendency is to say indicate rather than prove in most cases.
2. In very simple terms one forms two groups: one which is exposed to the intervention and one which is not and then we observe if there is any difference because of the intervention.
3. Typically indicated when the research question starts with 'how' or 'why'.
4. The researchers must be in control of the events being looked at and they must be contemporary
5. The biggest risk is that there may be other variables involved which we are not aware of.
6. It is difficult to be sure that our sample is representative.

7.9 Rationale: Quasi-Experiments

This form of research is used where there is a hypothesis and associated variables but you cannot control any of them. It would be nice to think we always had time and resources to run a carefully designed experiment but unfortunately this is often not the case. In an experimental design one chooses the samples involved randomly and thus one has control. However, it may be that data already exists and you can test your theory on that existing data or it may be that you simply cannot get control over all the variables that you want. So an experiment and a quasi-experiment are very similar it's just that the quasi-experiment does not quite have all the trappings that a full experiment has.

7.10 Rationale: Surveys

This form of research is used when we want to ask a group of people a question or questions. Typically:

1. Surveys are commonly used when one needs to get and express an overall **understanding** of the properties in a given domain.
2. One could of course also survey 'things' as well as people.
3. Surveys lend themselves to future replication.
4. Typically indicated when the research question starts with 'who', 'what', 'where', 'how' many' and 'how much'
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. Questions must be well-designed and unbiased and may be asked by interview or questionnaire.
7. Be careful to distinguish questions that are asking for facts and questions that are asking for opinion
8. The results will be very dependant on having a big enough and representative sample.
9. Be clear as to how the data will be collected – by observation, interview, questionnaire, etc. You will have to have a protocol to say when a valid sample arrives.

7.11 Rationale: Biographies/History

This form of research is used when we want to trace an historical event and analyses/evaluate its history as this may lead to insights or explain certain action so that lessons may be learned.

1. Biographies/History are commonly used to form a **description** and **explanation** of events.
2. One can use this to look at individuals or organisations or even technology.
3. Typically indicated when the research question starts with 'what'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. Be clear as to how the data will be collected – by documentary study and interviews are common.
7. Histories are naturally chronological and are characterised by epiphanies (pivotal events) and almost always exists in a context.

7.12 Rationale: Grounded Theory

Here the main idea is to use research to arrive at a theory based (grounded) on collected data. Grounded theory is quite difficult to understand and practice.

1. Grounded theory is used in situation where the theory is unclear or even unknown and so there is a need to **explore** seeking **description** and **explanations** in a domain.
2. One can use this to look at organisations or technology.
3. Typically indicated when the research question starts with 'why'.
4. You cannot control the events being looked at but the events need not be contemporary.
5. This is typically a qualitative study.
6. Be clear as to how the data will be collected – by documentary study, interviews, questionnaires etc.
7. Grounded theory is systematic in that the idea is to gradually move closer to a position where we can suggest a theory or proposition.
8. The basic unit of research is the category which is something that may represent a unit of information and might be almost anything.
9. The essence of grounded theory is in its data processing where various forms of coding are used to gradually unlock meaning in the data.

Open Coding – essentially the formation of the initial categories of information – it is characterised by looking for properties or asking when the something is a dimension of the research space.

Axial Coding – this is about trying to assemble that data after open coding. This can be done by using a diagram or some logic that connects things or looking for causes or looking for contexts and consequences.

Selective Coding – here the researchers invents a plausible storyline that integrates the categories in the axial coding model.

Matrix – a final step (though often omitted) is to produce a conditional matrix that is supposed to make clear the social, historical, technological or economic conditions that prevail in a situation.

Theory – one hopes that as a result of all this processing a theory will emerge which of course may go on to be tested by a formal experiment.

7.13 Rationale: Ethnography

This form of research is used when to immerse ourselves in the day to day life of an organisation or group. In this context ethnography is a description and interpretation of a cultural or social group.

1. Ethnography is commonly used when we want a reflective **description** expressed in an **interpretive** manner.
2. One can use this to look at individuals but more typically organisations.
3. Typically indicated when the research question starts with 'why'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. You may alter the events being looked at because you are normally a participant observer.
7. Be clear as to how the data will be collected – by participant observation.
8. Ethnography is about immersion in a culture: behaviours, language, structures and functions.
9. In such studies one often encounters gatekeepers, key informants and communication relies on a sense of reciprocity by investigator and his subjects.

7.14 Rationale: Requirements Gathering

Requirements are simply a statement of a systems service (what it must do) or constraints (what it does not necessarily do). In practice saying what a system must do is often extended to how it will do it. This method is a form of action research but it differs in that the only contact one has with the people involved is at the requirements stage and possibly at the implementation stage though this may vary depending on the systems life cycle employed. You should use this method when you are setting out to build an application of some kind such as a computer application. There are 4 stages of requirements.

Functional Requirements - These are requirements that say what a system does or is expected to do. Typically this would involve or include most of the following: process descriptions, details of all inputs/outputs and details of all the data that must be held in the system.

Performance Requirements - This is usually understood to mean requirements that describe aspects of the system that are concerned with how well it provides the main functional requirements. For example: performance criteria such as response times or how long it takes to print a report, data throughput and storage needs and security considerations.

Technical Requirements - This aspect of requirement looks at the tools and method used to build the system. For example, it may happen that you have to use a certain database package or for other reasons you need to select a particular scripting language and so on. More often than not this aspect amounts to looking at technical constraints that must be applied in building the system.

Usability Requirements - Requirements that ensure that there is a good match between the system and its users. In most cases usability is expressed in terms of measurable objectives.

7.14.1 The Requirements Document

The system and software requirements are usually documented in a formal manner so that ones understanding may be communicated to customers and system builders. The requirement document describes the following:

Services and Function – that the final system must deliver.

Operational Constraints - under which the system must operate.

Development Constraints - on the process used to develop the system.

Properties of the system - in the sense that it may have unplanned additional functionality.

Links - definition of other systems with which the system must integrate.

Domain - Information about the application - for example how to carry out certain tasks.

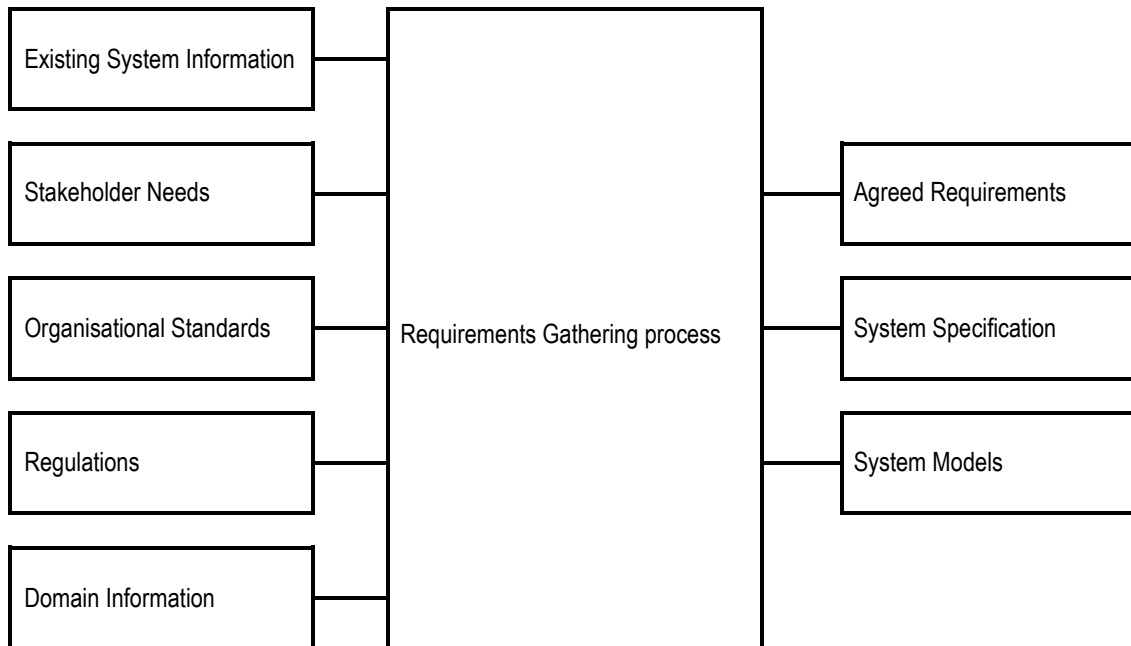
Definitions – acronyms, abbreviations etc.

7.14.2 Stakeholders

These are people who will be affected by the system and therefore should have a direct or indirect influence on the system requirements.

7.14.3 A Process Model

As a process model we might define the requirement process as follows.



7.14.4 Requirement General Questions

There are perhaps four general questions we might ask when attempting to gather requirements

Problem - What are the problems with the current processes?

Improvements - What are the improvement goals?

Reference. Kotonya, G. and Sommerville, I, (1997), Requirement Engineering, Wiley, ISBN 0-471-97208-8. This book is useful because it also contains excellent reading and reference lists.

7.15 Research Design

Finally, you must set out your research design. That is, explain how you will get your data – and this must be done in great detail. In summary, then, your research design is the blueprint of your research project which enables you to deal, systematically, with:

What questions to study?

What data is relevant?

What data to collect – you will need to work very hard here so that you can rely on your data.

Are there any practical limitations to what you can do

How to analyse the results – don't shirk this.

How to decide in which contexts your findings are applicable or can be exploited.

The main purpose of your research design is to help you avoid a situation in which the evidence you eventually collect does not address your initial question.

7.16 Research Process Development

It is quite common is many kinds of research but notably in Case Study and Action Research for the researcher's perceptions to change as data emerges. Often this will imply that the research design has to be changed or amended if it is to remain meaningful. These changes may be small such as a slight modification to the Research Question or aim but occasionally it may be necessary to make significant changes. For this reason researchers must always be careful in their design to allow a little flexibility if they can to accommodate possible unforeseen circumstances.

8. WORKBOOK 8 - BIBLIOGRAPHIC REFERENCING HARVARD APA

This workbook is a short summary of the APA style guidelines as contained in The Publication Manual of the American Psychological Association, 5e, 2001 (Subject Reference Collection: 808.02 AME).

The APA style is based on the Harvard referencing system whereby the date of publication follows the author name(s), and in-text references refer to items in the reference list using the author surname and date of publication, in brackets.

Referencing is important in all academic work as it indicates to the reader the sources of your quotations and borrowed ideas. Failure to indicate your sources is tantamount to plagiarism (literary theft). The purpose of the referencing system is to describe your sources in an accurate and consistent manner and to indicate within the text of your paper where particular sources were used.

Please note that there are two sections to this document:

How to **reference** correctly a source in the **bibliographic** section of your work

How to **cite** correctly a source in the **written** part of your work

Don't Get Caught Out! If you do not reference correctly you may lose marks or your work may be returned unmarked to you for correction. Therefore:

Keep a careful note of all sources used as you prepare your assignments.

Record all the details you need about a library book (including page numbers for any quotations) **before** you return it - someone else may have the book if you try to go back and check later.

Make sure you write down the source details you need on any photocopies or downloads you make.

Remember to print or save details of any website you want to refer to and record the date when you accessed the information.

8.1 Reference list (Bibliography) at end of Project/Dissertation

The reference list should be arranged alphabetically by author surname. The APA format requires book and journal titles etc. to be italicised, although we are not strict about that.

As a rule in projects and dissertations it is normal to produce two lists. The first is a reference list and that **MUST** only include sources you have cited. The second is a bibliographic list which includes all other sources you might have found but did not cite – this list is to allow the reader to explore the topic further if they wish.

8.2 Books

The details needed for a book can normally be found on the front and back of the title page. Make sure you locate the name of the publisher rather than the printer or typesetter. You need the name of the publisher in your reference list. Ignore any reprint dates; you need the date when the first, second, third edition etc. of the book was published according to which edition of the book you are using.

8.3 Journal articles

The details needed for a journal article can usually be found on the contents list, front cover or article itself.

8.4 Printed publications: Examples of References

The following are sample if how to correctly reference a source.

Book – pattern: Author, Initials. (year). Title of book. Place of publication: Publisher.

American Psychological Association. (1994). Publication manual of the American Psychological Association 4e. Washington, D.C.: Author.

Encyclopedia of psychology. (1976). London: Routledge.

Gardner, H. (1973). The arts and human development. New York: Wiley.

Moore, M. H., Estrich, S., McGillis, D., & Spelman, W. (1984). Dangerous offenders: the elusive target of justice. Cambridge: Harvard University Press.

Strunk, W., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

Note: Only list up to 6 authors. The 7th and subsequent authors are abbreviated to et al.

Edited book

Maher, B. A. (Ed.). (1964-1972). *Progress in experimental personality research* (6 vols.). New York: Academic Press

Article in edited book (Chapter) - The basic pattern for a reference to a chapter in an edited book (where the chapters have been written by several different people) is:

Author of chapter, Initials. (year). Title of chapter. In Initials. Name of Editor/s (Ed.) *Title of book* (pp.start and end page numbers of chapter). Place of publication: Publisher.

Vygotsky, L. S. (1991). Genesis of the higher mental functions. In P. Light, S. Sheldon, & M. Woodhead (Eds.), *Learning to think* (pp. 32-41). London: Routledge.

Encyclopedia entry - If the entry has no author, begin the reference with the entry title followed by the date of publication.

Lijphart, A. (1995). Electoral systems. In *The encyclopaedia of democracy* (Vol. 2, pp. 412-422). London: Routledge.

Government publication

Great Britain. Command Papers. (1991). *Health of the nation* (Cm 1523). London: HMSO.
Great Britain. Home Office. (1994). *Prisons policy for England and Wales*. London: HMSO.

Report

Birney, A. J., & Hall, M. M. (1981). *Early identification of children with written language difficulties* (Report No. 81-502). Washington DC: National Educational Association.

Conference paper in published proceedings

Borgman, C. L., Bower, J., & Krieger, D. (1989). From hands-on science to hands-on information retrieval. In J. Katzer, & G. B. Newby (Eds.), *Proceedings of the 52nd ASIS annual meeting: Vol. 26. Managing information and technology* (pp. 96-100). Medford, NJ: Learned Information.

Journal article - The basic pattern for a reference to a journal article is:

Author, Initials. (year) Title of article. *Title of journal*, Volume number - if there is one (Issue number), start and end page numbers of article.

Noguchi, T., Kitawaki, J., Tamura, T., Kim, T., Kanno, H., Yamamoto, T., et al. H. (1993). Relationship between aromatase activity and steroid receptor levels in ovarian tumors from postmenopausal women. *Journal of Steroid Biochemistry and Molecular Biology*, 44(4-6), 657-660.

Popper, S. E., & McCloskey, K. (1993). Individual differences and subgroups within populations: the shopping bag approach. *Aviation Space and Environmental Medicine*, 64(1), 74-77.

Weekly magazine article

Barrett, L. (2001, August 23). Daewoo's drive to survive in the UK. *Marketing Week*, 22-23.

Newspaper article

Caffeine linked to mental illness. (1991, July 13). *New York Times*, pp. B13, B15.
Young, H. (1996, July 25). Battle of snakes and ladders. *The Guardian*, p. 15.

Two or more works by the same author(s) with the same publication date - Where an author (or particular group of authors) has more than one work in a particular year, list them in title order and follow the date with a lower case letter a, b, c, ... For example:

Harding, S. (1986a). The instability of the analytical categories of feminist theory. *Signs*, 11(4), 645-64.
Harding, S. (1986b). *The science question in feminism*. Ithaca: Cornell University Press.

Anonymous works - If a work is signed "Anonymous", your reference must begin with the word Anonymous, followed by date etc. as normal. If no author is shown, put the title in the normal author position.

Note on source page numbers - Use pp. for page range only for encyclopedia entries, multi-page newspaper articles and chapters or articles in edited books. For articles in journals or magazines use the numbers alone.

Interviews and email messages - Because interviews and email messages are not considered recoverable data, you do not give details in your reference list. You should, however, cite an interview or email message within the body of your text as a personal communication: ...and this point was conceded (J. Bloggs, personal communication, August 22, 2001)

Legal References - Because the situation regarding legal references is complex and only US law is covered in the APA Manual, legal references will be covered in a separate guide.

Audiovisual sources: examples of references - Such sources are often complex but please note.

Films - The basic pattern for a reference to a film is:

Name of primary contributor - the director or producer, or both, Initials. (Role of primary contributor). (year). *Title of film* [Motion picture]. Country of origin - where the film was primarily made and released: Name of studio.

Reed, C. (Director). (1949). *The Third Man* [Motion picture]. United Kingdom: British Lion/London Films.

Spielberg, S. (Director). (1993). *Jurassic Park* [Motion picture]. United States: Universal Pictures/Amblin Entertainment.

If the film doesn't appear on the Library Catalogue, the Internet Movie Database <http://uk.imdb.com/> is a good place to check all the details needed for a film reference (follow the Company credits link to find details about the film studio/s involved). Alternatively, check Halliwell's Film and Video Guide.

Review of a film - If the review is untitled, put everything in square brackets in the normal title position and keep the square brackets.

Kinder, M. (2002). Moulin Rouge [Review of the motion picture *Moulin Rouge*]. *Film Quarterly*, 55(3), 52-59.

Malausa, V. (2001). Beauté du mensonge [Review of the motion picture *The Tailor of Panama*]. *Cahiers du Cinéma*, 558, 82-83.

Television programmes

Collinson-Jones, C. (Producer), & Dobson, E. (Director). (2003, July 14). Casualties of peace [Television broadcast]. London: Channel 4.

Single episode from a television series

This example shows the most complete information possible for a television episode. If details of the writer are unavailable, begin your reference with the name of the director.

Fraser, R. (Writer), & Geoghegan, S. (Director). (2003). Eyes wide open [Television series episode]. In P. Goodman (Producer), *Holby City*. London: BBC1.

Radio programmes

Portenier, G. (Producer). (2003, July 17). *Crossing continents*. London: BBC Radio 4.

Electronic sources: examples of references - The details shown below have been compiled according to the guidelines available on the APA Website (<http://www.apastyle.org>) in August/September 2001 (re-checked July 2003). Check this Website and the 5th edition of *The Publication Manual of the American Psychological Association* which is available in the Frewen Library for further guidance.

The basic pattern for a reference to an electronic source is:

Author, Initials. (year). *Title*. Retrieved month, day, year, from Internet address.
Banks, I. (n.d.). *The NHS Direct healthcare guide*. Retrieved August 29, 2001, from <http://www.healthcareguide.nhsdirect.nhs.uk/>

If no date is shown on the document, use n.d.

If the author is not given, begin your reference with the title of the document.

If a document is part of a large site such as that for a university or government department, give the name of the parent organisation and the relevant department before the Web address:

Alexander, J., & Tate, M. A. (2001). *Evaluating web resources*. Retrieved August 21, 2001, from Widener University, Wolfgram Memorial Library Web site: <http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm>

Deciding your future. (2000). Retrieved September 5, 2001, from University of Portsmouth, Careers Service Web site: <http://www.port.ac.uk/departments/careers/plancareer/deciding-your-future.htm>

Electronic journal articles which are duplicates of the printed version - Use the same reference format as for a printed journal article but add "Electronic version" in square brackets after the article title:

Lussier, R. N., & Pfeifer, S. (2001). A crossnational prediction model for business success [Electronic version]. *Journal of Common Market Studies*, 39(3), 228-239.

If you are referencing an online article where the format differs from the printed version or which includes additional data or commentaries, you should add the date you retrieved the document and the Web address (URL).

Articles in Internet-only journals

Korda, L. (2001, July). The making of a translator. *Translation Journal*, 5(3). Retrieved August 21, 2001 from <http://accurapid.com/journal/17prof.htm>

Use the complete publication date shown on the article.

Note that page numbers are not given.

Whenever possible, the URL you give should link directly to the article itself.

Break a URL that goes onto another line after a slash or before a full-stop. Do not insert a hyphen at the break.

Articles retrieved from a database - Use the format appropriate to the type of work retrieved and add a retrieval date, plus the name of the database:

McVeigh, T. (2000, July 9). How your gestures can do the talking. *The Observer*, p.7. Retrieved September 10, 2001, from The Guardian and The Observer on CD-ROM database.

8.5 Citing references in the Text

There are basically two forms. The first is when the author's name is naturally part of the sentence and the second when it is just a reference. References are made from the text of the paper to the full details of the work in the reference list in the following manner:

It is a contention of the paper, and this contention is supported by Williams (1995, p.45) who compared personality disorders ...

When an author, or group of authors, has more than one publication in the same year a lower case letter is added to the date. For example:

In two recent works Harding (1986a, p.80; 1986b, p.138) has suggested that ...

With two authors both names should be listed in each citation e.g. Duncan & Goddard, (2003, p.99)

With three to five authors name all authors the first time, then use et al. (and others). For example: the first time it would be Moore, Estrich, McGillis & Spelman (1984, p.33) and subsequent references to the same publication would use Moore et al.

For six or more authors, use et al. after the first author in all occurrences.

Note that when the in-text reference occurs naturally within the sentence "and" should be used before the final author.

When a source has no author, cite the first two or three words of the title followed by the year. For example:

... in the recent book (*Encyclopaedia of psychology*, 1991, p.62) ...

... in this article ("Individual differences," 1993, p.12) ...

Web pages where no author is given

However, if the author is designated as "Anonymous", cite the word Anonymous in your text e.g. (Anonymous, 1993, p.116).

When using quotations in your text

Try to observe the following methods.

Gardner (1973, p41) stated that, "The relative importance of the systems may nevertheless remain in approximately the same proportion"

Smith (1991, p84) found that "...there is no evidence that chimpanzees can produce a drawing and discern the object represented in it..."

Occasionally, very occasionally you may need to cite a work that you discovered in another work because you cannot find the source then observe the following examples:

Smith (1970, p.27) cites Brown (1967) as finding ...
Brown (1967), cited by Smith (1970, p.27), found ...
It was found (Brown, 1967, cited by Smith, 1970, p.27) that ...

If you need to use this form your tutors must approve it and you must show that you have made every effort to track down the primary source.

9. WORKBOOK 9 – WRITING UP A RESEARCH PROJECT

This workbook is in several sections covering everything from project supervision to grading.

9.1 Your and Your Supervisor

The student supervisor relationship is very important if a high quality project is to be achieved. As a rule the supervisor will be interested in the topic area and will want to be active in its development although you as a student must do the work. However, your supervisor will not be expert in everything but will usually have some knowledge of simple statistics and the four main research methods: experiments, action research, surveys, case studies and application development.

9.1.1 Student Expectations

The normal expectation is that students have of their supervisor are as follows:

- Only be available for consultation for a limited time.
- Only supervise what the student does and not do the work for them.
- Advise on research design, scheduling and literature surveys.
- Advise on theoretical, conceptual and methodological issues.
- Advise on development of research skills.
- Advise on data collection, processing and analysis.
- Advise on ethical issues if they are relevant.
- Read, evaluate and be constructively critical of student work if given sufficient time.
- Have a good knowledge of the general area you are working in.
- Be in contact with the student regularly.
- Arrange if necessary supervision chat sessions.

For project students on distance learning programmes it will be possible to have meetings in the WebCT chat room, using IM or Skype where a full and detailed interaction can take place. These must normally be agreed with your supervisor and must be planned not to clash with other classes. However, some tutors may allow student to contact them any time they are seen to be online.

9.1.2 Departmental Expectations

Supervisors take a formal role and certain attitudes and actions are expected. In general they will:

- Visit the discussion board and email regularly within WebCT (at least 3 times per week).
- Set a mail forwarding address to their personal accounts in WebCT email settings.
- Devote at least 6 hours to the supervision process spread over the project duration.
- Conduct one-to-one chats as required with project students.
- Conduct student/supervisor communication within WebCT or their personal email account.
- Respond to a student query within a certain time frame (normally no longer than 3 days).
- Be familiar with all the project guidance notes and workbooks.
- Be familiar with the project chapter profiles.
- Make sure students know if they are to be away for an extended period.
- Be aware that students may make contact through any one of several WebCT accounts.

The essence of online supervision adequacy is based on the quality of communication between supervisor and student with the intent that we want the learning experiences to be exciting, stimulating and self-rewarding. In practice this means that communication must be frequent, lucid, critical and yet encouraging.

Supervisors should be aware that if they set email forwarding in WebCT they will effectively get an automatic alert when there is mail for them. If the student has also set mail forwarding then supervisors will be able to reply immediately otherwise they will have to go into WebCT. However, there is no alerting mechanism if a student posts a question into discussion so supervisors must visit the site from time to time so as not to miss any messages.

9.1.3 Supervisor Work Reviews

Supervisors will read your written work. However, when they do this certain rules apply:

Finished work – you should supply your supervisor with written work as it is produced chapter by chapter but it must be finished work. In this context finished work means that the format and content are the very best you can produce and in accordance to the guidelines found in this workbook. The tutor's role is not to act as some kind of filter for rough work or polishing multiple drafts which you want to improve in effect making them do the work for you. If a tutor suspects that the section you have sent in is not in its final form they will return it to you without comment.

Action on Feedback – if you are given feedback on any part of your work then you are expected to study it with care and commitment. However, it is up to you how to respond or even ignore what you are told but in all cases the consequences that follow are entirely your own responsibility.

Responding to Feedback – in all cases you are expected to respond to feedback. This may take several forms: writing to your supervisor saying that you don't agree with him or perhaps offering further explanation or as in most cases making changes to the content or structure of your project document. When you make document changes in response to feedback they are to be shown **shaded** so your supervisor can easily see exactly what you have added or amended.

Questions to Tutor - your tutor will not answer any questions regarding whether your work is right, wrong, is it a pass, what mark will I get or is it good enough. The only thing you can expect in this area is that you tutor may advise you that the work is not ready for submission to the university. If this happens it will be entirely your own decision whether to submit or not but if you do not submit a fail will automatically be recorded and you should be aware that extensions will not normally be given.

Response from Tutor - in most cases your supervisor will only suggest that you do something or ask a question designed to point you in a new direction. Normally, the tutor will not supply you with any project content since that must be provided entirely by you. The reason is that the work is yours not the supervisors.

Preparation - Your supervisor will expect you to be familiar with all the notes and workbooks contents. You should therefore be careful that you don't waste supervision time asking questions to which you already have the answers.

9.1.4 Chat Session

Chat sessions for project students will usually be one-to-one and typically used when there are particularly awkward difficulties – chat will NOT be the norm during projects and your tutor will have no expectation that chat will be used.

9.2 Overview of Project Structure

Here are some general guidance notes – they are NOT suggested chapters but general content guidance on the project as a whole and have a sharp process focus.

9.2.1 Introduction summary

This is about the problem theme and its setting, target, client context, topic area, personal theory, Research Question or application functional description and intended project outcome, general research orientation followed by a well-defined aim and sound set of objectives. The introduction is to be precise but concise taking a discussion form that is explanatory and focused on giving readers a clear, coherent and comprehensive view of what the project is about.

9.2.2 Preparation for Research

This is your study of the topic area and research methods that you will need to know about. You will have to justify and explain the methods you intend to use; it is also your study of other people's work in the area that you wish to investigate - and a description of how you learned from their research.

Literature Review - What has been done before in this area - related to a particular problem theme and your Research Question? This is all about preparing one's mind with all the topic area and research knowledge you will need.

Research Review - research into how the project investigation could be done and supported. At this stage student will already have an outline plan based on their approved specification but now the whole design must be thoroughly reviewed before actual work begins.

Knowledge of Alternatives – build a simple decision base which allows one to consider which methods could be used and how could they be used for this project.

Choices Made - which methods are to be used and rationally consider why they are good enough for the purpose.

9.2.3 Core Research

Here you execute the refined research design translated into a practical plan to obtain the collection of primary data and process it using acceptable methods into the intended project outcome.

9.2.4 Evaluation and Conclusions

This is the stage that looks at how one finishes off a project by a process of evaluation and the drawing of conclusions. In particular, it is needful to look at how one evaluates what was done and how it was done – that is, one needs to consider the project product (or outcome) and the project practice. For our purposes evaluating will be taken to mean reflecting on product and practice.

Many students confuse evaluation and conclusions but for a full consideration of the research work one must look at all project specific evaluation of results and outcomes as well as practices and then perform the more difficult step of drawing generalised conclusion about both product and practice.

Evaluation of Project Product – the specific project outcome or product is normally evaluated against objectives, other existing products, using defined criteria or some form of expert evaluation. Additionally, one needs to be aware of any constraints that might have an impact on the applicability of the outcome. However, typically one asks about the outcome (product): has it any value, who will use it, what will they use it for, will it get you your target effects that sort of thing.

Evaluation of Project Practice - evaluation of specific project practice is more difficult than evaluation of project outcome (product) and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking 'how well did I do it', 'was it successful' and 'should I on reflection have done it another way', 'did I make any mistakes', 'were there any surprises', "have I discovered any principles" and indeed did you learn anything. Additionally, one needs to be aware of any constraints involved, including time management that might have impacted on the use of best possible practices.

Conclusions – here we are trying to go beyond the obvious project findings and so we need to consider thoughtfully implications and meaning that arise out of an attempt to generalise about the topic based on your findings/outcome - that is you might have set your project in the Caribbean but do any of the findings have wider implications, are there general lessons to be learned, have you uncovered a principle or is there any sign of a best practice here that kind of thing.

9.3 Writing up your Project

The following sections describe elements that occur in almost all projects and which are generally important in constructing scholarly work. Do not be tempted to ignore these instructions – anyone who departs from the spirit of them may have their work returned for correction prior to formal marking.

9.3.1 Main Project Body Page Layout

The following shows how each page of a project report should look, note that each chapter starts on a new page and that it is NOT necessary to actually say Chapter 1, Chapter 2 and so on as it is the heading that is important. Do not use numbering to greater than three levels but you may use indented (but not bulleted ones) entries within a section at any level.

1. QUALITY CONTROL IN PROGRAM DEVELOPMENT

In this chapter the nature of quality will be discussed and its relation to physical measurable properties that might characterise quality.

1.1 INTRODUCTION

This project discusses a possible strategy for devising a program development methodology that goes some way to guaranteeing the qualities of the program code of delivered system. In particular it will concentrate on just two aspects - that of developing generic designs and code and how such designs could be assessed for quality and function. The strategy is based on the simple premise as endorsed by leading authors in the field such as Wilson and Bowers that categories of problem can be identified and formalised. It is the contention of this report that such a process would more or less automatically:

Reduce - the complexity of the design process itself.

Ensure - the quality of the final product by:

Giving managers more control over the product development cycle.

Giving users more idea of the kind of system they are likely to get and much more say in what the shape of the product will finally be.

Releasing programmers from the drudgery of having to design the same piece of code over and over again, thus enabling them to concentrate their efforts on new

1.2. Multiplicity of Design Factors

Every programmer has had the difficult experience of having to read and understand programs written by someone other than himself or herself. The sort of problem encountered may be aptly expressed in the following lines.

Everything has been thought of before, but the problem is to think of it again. (Goethe)

Many other authors, notably Frewin (1989) have discussed the notion of 'quality model ratios' and in essence this idea means that software systems have an implied model which can be accessed for

1.2.1 Multi-Tier Systems

In modern client sever systems

1.2.2 Interface Facades

In this case we look closely at the Internetetc

9.3.2 Plagiarism Checking

A software tool will check all your sources automatically and if plagiarism is identified it will be dealt with very seriously since the reputation of the whole course and of the University is at stake. You must remember, that copying, paraphrasing, summarising and similar techniques where the material is extracted from a source must be properly acknowledged. A simple rule is that if you use more than 6 consecutive words from a source it must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

9.3.3 Writing Abstracts and Identifying Keywords

The function of an abstract is to summarise your project, its context and its conclusions in order to give the reader an overview of the main project theme so that they can make an informed decision on whether they want to read the entire report. A good basic structure might be defined as follows but it will usually be limited to around 300 words.

What was the project about?

What did you actually do?

What were the conclusions/outcomes?

It is normal to add keywords or phrases after the abstract to act as specific pointers to content. There are no particular rules about how to construct these words or indeed how many there should be but typically there are 5 or 6 and to be useful they must be chosen with care in the sense that they might in themselves be regarded as a sort of abstract of ones work.

9.3.4 Standard Appendices

Project reports MUST include at least the following appendices:

Project specification and project Plan – it may be brought up to date from that submitted at the start

A glossary if this is appropriate

A full reference list of work that you cited

A bibliography (may be combined with your citation list)

Each Appendix should be introduced by a title where the number (12 in this case) should follow on from the numbering within the body of the report: **12. Appendix A – Project Specification.**

9.3.5 Typical Project Organisation

Below is a suggested organisation for your complete project.

Briefing Pages

Heading pages (examples follow later in the section)

Plagiarism declaration

Abstract for Report including keywords

Acknowledgements

Dedications

Content list (automatically generated) for all headings, tables and figures/graphs etc

Introduction:

Brief topic area outline and background to problem
Presenting Problem definition
Real World Target relevant to the problem
Speculation of problem causes/symptoms and possible solution routes
Personal Theory on the best solution route leading to a named outcome and actor
Research Question/Application Description
Scope and scale of work
Aim and Objectives

Literature Research (see Workbook 5 for recommendation for various project styles)
Detailed consideration of elements that help you focus on your topic area

Research Design

Research Method and its selection rationale in dealing with the research question/application
Process to collect Primary Data
Process definition to get from Primary Data to get an outcome

Application Testing (Engineering project only)

Design of Tests
Test Results and conclusions to be drawn from testing.
Implementation plans

Results Discussion and Presentation (study projects only)

Discussion and presentation of primary data
Generation of intended project outcome

Evaluation (this is specific to what you did)

Detailed evaluation of what was actually done – your practice
Detailed evaluation of your project product/outcome including objectives not met
Met/Not met objectives

Conclusions (here one tries to generalise what was done)

Main generalisations based on a consideration of both product and practice
It is also possible to examine the following minor conclusion elements but if this is all you produce the mark allocated will be very low.

- Usefulness of literature sources
- Future work/development
- Relevant aspect of the course used during the project period
- Changes one would make if project were repeated
- What you have learned
- Value-added features

References and bibliography (see workbook 5)**Content of Appendices**

The following items must be in a set of Appendices. These may be bound separately if the composite document becomes too large (more than 100 pages).

- Code listings
- Project Specification and project schedule
- Inclusions (copies of relevant documents such as policies, invoice layouts, diagrams etc)
- Questionnaires.
- Summary interview transcripts
- Details test plans
- Requirement catalogues
- Glossary
- Other

9.3.6 Project Types Sample Outline Contents

Broadly speaking there are two kinds of project: engineering where you build an application of some kind and study based where one would investigate in depth some idea. Here are some sample contents lists that show chapter or section headings for the different project styles. However, if it is obvious that these samples have just been copied into your project with minor changes then your work will be rejected. See Workbook 9 section 9.3.5 for further general details.

Sample Study Style Report Contents	Sample Engineering Report Contents
Title: Internet Marketing – A Users View	Title: BrokerBase – Insurance Sellers Information System
Chapter 1. Introduction to Internet Marketing	Chapter 1. Introduction to System
Introduction and contextualisation IT marketing problem theme Problem Theme, Target and Outcome Discussion and Exploration of Research Question Project aim and objectives	Introduction and Situation Overview Situation based Presenting Problem Application background and context Application overview Project aim and objectives
Chapter 2. Literature Review	Chapter 2. Literature Review and Application Scenario
Introduction to Internet Marketing Marketing Planning eCommerce Technologies and Tools Costs and Benefit Estimation Consumer Orientation and Market led operations IT supported Marketing and selling techniques Product, Price, Place, Promotion and Customer expectation IT supported Experiential marketing Security protocols and languages Auditing and secure payment systems	Outline of Insurance Brokerage practice Background Review of the Application Scenario Outline of Application Build Process and Tools
Chapter 3. Research Design	Chapter 3. Requirements Specification
Research Method Selection and Rationale Primary data collection process Data specification Data locations and expectations Collection Protocol Processing of Primary Data Collection Outline Results Project Outcome	Outline of the requirements (requirement catalogue into appendix) Research Plan for requirement gathering: functional, performance, technical and usability Outline Requirements catalogue Analysis and Evaluation of requirements
Chapter 4. Evaluation (Project Specific)	Chapter 4. System or Application Design
Evaluation of Project Outcome Evaluation of Research Methods and Protocols used	Principles used for this design Overall system design Build Process Overview Database design Component design Interface design including website
Chapter 5. Conclusions (Project Generalisations)	Chapter 5. System Implementation and Testing
Generalisations on the research Outcome Reflections on what was learned etc	Testing strategy Testing plans (detailed plan placed in appendices) Test results (detailed report placed in appendices) Application Implementation plans
	Chapter 6. Evaluation
	Evaluation of the application Evaluation of practice (methods and tools used)
	Chapter 7. Conclusions
	Generalisations based on the Application Reflections on what was learned Future work Etc
Notes	
1. Whatever the project styles the appendix must include: the project specification, glossaries, references lists, bibliographies. The appendices may be attached to the main report or they may be placed in a separate document.	
2. Remember these are just samples and you may well have different numbers of chapters and different heading and sub-headings	
Table 4. Sample Project Content Outlines	

9.4 Report Writing

In your research generally you will often have to write reports and of course you will have your final project report to write. Reports are a special form of writing and therefore you need to note that reports are:

- Written for defined purpose and targeted at a specific audience.
- Written systematically to present your of findings and outcome.
- Focused on what you have done.
- Information structured and formatted to lead reader quickly to main themes, findings and outcome

9.4.1 Structural Elements

It is important to structure all your work in a way that enhances its usefulness and utility. The following is a list of all the major structural elements, though there is no need to use all of them in every document you produce. The best advice is to choose a structure and then those elements that best suit the work in hand.

Structure	Description	Location
Title	A focused and short description of the document that summarises the deliverable element	Front page and above the contents list
Contents List	A short index based on the major chapters and/or sections	Before the main document begins but after the title page
Glossary	Used to list and describe special terms or abbreviations	Towards the end of the main document
Index	A detailed listing of all important words or phrases specifying location in main text	After the glossary if it exists otherwise after the main document
Appendix	For inclusion of explanatory notes, special documents or copies of originals	After the glossary but before the index
Footnotes	Notes at the bottom of pages and linked to pieces of text.	Immediately before the page footers
Headers	Standard text	Every page
Footers	Standard text	Every page
Keywords	Words or phases used to form a simple classification of your work	Near front of report
References	List of all reference material in an approved manner	Toward end of document
Table 5. Main Document Physical Structural Entities		

Organisation	Description
Chapters	Major elements in the development of the subject matter of the document
Sections	Minor elements in development of each chapter
Headings	Major Information Content indicators
Indents	Used to emphasise small but important points in the text
Bullets	Used to further emphasise an indented text
Tables	Used to represent important information concisely
Paragraph numbers	Used when it is necessary to reference all parts of a text
Page numbers	Used for indexing purposes
Diagrams	Used to show idea or data pictorially
Captions/Legends	Added to diagrams where necessary
Columns	Use when the subject material lends itself to such a view
Table 6. Main Document Structural Devices	

Presentation	Description	Examples
Font	Letter style and size	May be proportional or fixed point
Renditions	Printed form of font	Bold, underline, italic, reversed
Orientation	Page format	Portrait or landscape
Form	Delivery form	Paper, electronic
Table 7. Main Document Structural Properties		

9.4.2 Report Writing Stages

There are a number of stages to writing a report and they require you to be focused on what you are trying to say at the core of your report.

What are your trying to show – this really goes along with the underlying purpose of your research question – typically this will be about wanting: to inform, to explain, to evaluate, to prove, to advise, to recommend, to predict or to bring about changes.

Collect and sift material – it is important to jot down ideas relevant to your purpose. These jottings will help you form an action plan for gathering information from other documents, visits, interviews, observation, surveys etc.

Note – the exact location of information sources as you find them using Harvard APA format

Organise and structure the material - group your work into chapters, sections, sub sections, tables, appendices and so on and ensure their presentation order is logical.

Draft and edit/redraft – to get a good report you may well have to re-write it several times and this may include complete re-ordering. It is important that you need to be concise and use a formal language but it must be clear and concise. Use simple, straightforward words and sentence construction and make sure your spelling and grammar are faultless. Use clear headings and sub headings with bulleted indentations.

Thematic – make sure your work has clear themes that are easy to follow.

Plain English - do not try to be over-clever or fall into jargon.

Read Saunders chapter 13 pages 414 to 443. Don't skim on this or I might skim when I mark inferior work!

9.5 Project Submission Regulations

Successful project reports may be lodged in the University library, it is therefore important that reports follow a standard binding format as described below. Project reports that deviate from these regulations may be penalised and returned to you for correction and in extreme cases, failed.

Submission - two full bound A4 portrait orientation copies of your report must be submitted by the due dates. The report may NOT be submitted electronically – the copies must be sent by courier to reach us by the defined dates. However, you must also submit soft copies on either floppy disc or CD/DVD.

Presentation and Submission Checklist – your project report must be submitted using the correct form shown in Workbook 10. The form must be bound into your project.

Report Length - the maximum permitted report length is 15,000 words, which usually translates into around 50 to 100 pages (excluding appendices). If your report is likely to be significantly longer than this, consult your supervisor as to what to include and what to exclude. You are warned that should you exceed the permitted maximum length the University may return your work unmarked.

Binding - the project and any separate appendices should be securely bound using tape or book binding - if that is not available then plastic ring binding may be used. No other form of binding is permitted. Binding covers should be a card of weight of 140 gsm and the normal colour is to be RED but any other colour may be used in case of sourcing difficulties

Front Covers Format - the front cover appropriately spaced vertically should conform to the pattern shown below using 24-point Arial Narrow with centred text and bold as shown. Do not include the square brackets when you complete these formats as they are just placeholders

University of Portsmouth

School of Computing

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[Student No.]

Supervisor: [Name of supervisor]

Project unit Code [Project unit code]
[Month and Year, e.g. September 2004]

Title Page - the first project contents page, appropriately space vertically must contain the following information in the order shown below using 12 point Arial Narrow/Time Roman type throughout. Do not include the square brackets when you complete these formats as they are just placeholders.

University of Portsmouth

School of Computing

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[Student No.]

Supervisor: [*Name of supervisor*]

Project unit: [*Project unit code*]
[Month and Year, e.g. September 2001]

Abstract - [The abstract of the project should be between 150 and 300 words in length and constructed to say what the project was about, what you did and what were the conclusions]

Keyword List - [List of appropriate key words]

Acknowledgements Page - it is common practice to add a page listing those you wish to thank for their help. Acknowledgements should **only** be given to people who helped you directly with your work but were not involved in it. For example, if a colleague supplied you with a statistical analysis they should be acknowledged. However, it is not usual, necessary or desirable to acknowledge your parents, your wife or your friends.

Submission Form and Plagiarism Declaration

You must add the following two pages which require a signature. In practice one adds the signature to the final bound copies.

Declaration of presentation Standards

Include at this point a completed copy of the project submission checklist shown in workbook 10. Be warned, that if you tick this page and the relevant element is not found to be present, the work will be returned to you unmarked for correction.

Plagiarism Declaration

I confirm that the enclosed written work (including application code) is entirely my own except where explicitly stated otherwise. I declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

Signed _____ Date _____

Contents list, Table List and Diagram List

Include as appropriate

9.6 General Grade Criteria

Workbook 14 gives general guidance as to how projects will be assessed and also contains a table of the criteria used, although the emphasis given to various aspects may vary depending upon the nature of the work and should be explained to students in assessment specific criteria.

9.7 Project Examination Board Reflections

This is a discussion based on observations made on the marking forms and in the Examination Board regarding the quality of the submitted document as final Master's projects/dissertations. Most of these faults are due to shallow and sometimes very shallow thinking on the part of the project student and that is unacceptable at Master's level. The following points are to help both supervisors and students avoid known pitfalls and so produce a project document to a high standard.

9.7.1 Project Introduction – Study Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem definition – common deficiencies were no discussion or poor discussion of what problem was being addressed by the project. Without such a discussion it is almost impossible for a reader to get any grasp of what the project is about. In projects we want to see just ONE major problem theme not several so it often requires clear thinking to set it at the right level. (See workbook 6 section 6.2 and 6.11)

Target, Outcome and Actor – there is often considerable confusion over these ideas. The target is about what might happen in the real world based on the project outcome but often students cannot distinguish what the project will generate and what might be done with that project outcome by situation actors. As a simple example, students might say that the project outcome is "improved accuracy in data entry" when what they mean one supposes is that in their project they will design (say) a new training programme that will be used to get the real world target of improved accuracy. (See workbook 6 section 6.3, 6.4 and 6.5)

Speculation and Personal Theory – students are encouraged to speculate about problem causes and solution routes to arrive at a personal theory about the problem theme and how it might be resolved leading to a suggestion of an expected project outcome. A reader expects to see some indication as to what form the project outcome will take and in addition some discussion of the form to at least show that it is likely to go some way to resolving the stated problem theme and can indeed be used by the named situation actors. Unfortunately, the outcome was often missing or confused with the target and even when the Research Design was consulted a typical reader could still not see what the project outcome was supposed to be. Here we want to see ONE major form outcome for each project. (See workbook 6 section 6.6).

Research Question – often missing, badly worded, many of the 6 required features missing or multiple questions offered (sometimes all in one sentence). One common mistake was to ask a question in the form (or some equivalent) of "is it possible...." - the point is that in such questions the answer is almost always that it is possible so the research effort becomes pointless. (See workbook 6 section 6.8)

9.7.2 Project Introduction – Engineering Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem Theme - there was either no discussion or poor discussion of what problem theme the application being built was supposed to resolve. When this happens it is almost impossible for a reader to get any grasp of what the project is really about. (See workbook 6 section 6.2 and 6.11)

Functional Description - many students could not provide a short functional description of the application they were going to build. The most common thing for students to do instead was to provide an overview of the application architecture. This is hopeless as architecturally almost all Engineering projects are the same in that they typically have a database and a webpage for example. This implies that students cannot or do not want to make a distinction between how an application is built and what its purpose is.

9.7.3 Aim and Objectives

In many cases these elements were missing altogether. In other cases one could barely link the aim to the Research Question or application description. However, of most concern was an apparent inability in many students to write a coherent and reasonable set of objectives. Not to be able to write an aim and more particularly objective is representative of a gross student weakness and it should never occur in Master's level work.

Aim - usually composed in a reasonable way but there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just one clear outcome for the aim. (See workbook 6 section 6.13, 6.13.1)

Number of Objectives - often there were far too many to be in any way practical for one student in the time available and often this was because they were all expressed at different levels of project resolution or confused with minor project tasks. (See workbook 6 section 6.13 and 6.13.2)

No Visible Outcome - there were many, many cases where the objectives had no visible outcome. Far too often we got phrases such as: "To understand...." or "To analyse...." without any object to the sentence so there was no outcome that was visible. Without a named outcome there is no way that the objectives can be seen to have been completed. (See workbook 6 section 6.13 and 6.13.2)

Not Project Bounded - there were many students who cited operational objectives as outcomes. For example it was common to see lines such as "To improve the workflow in the invoicing section". Here is a case where such an outcome cannot be written into a document or be in practical terms viewed and so cannot be used in a project. Typically, unbounded objectives refer to something that might happen based on the project outcome after the actual project has been completed (See workbook 6 section 6.13 and 6.13.2)

Objectives as Requirements - very commonly but still rather worryingly, many students, on Engineering projects, seem to think that objectives are the same as application requirements. (See workbook 6 section 6.13 and 6.13.2)

Objectives as Benefits - less commonly but still rather worryingly, many students, on Engineering and study projects, seem to think that objectives are the same as benefits. For example, in a study project on CRM systems what one often finds in place of project objectives is a list of benefits of implementing CRM. Similarly, for Engineering projects we see objectives written as a set of benefits of using the application being used later on in the real world. (See workbook 6 section 6.13 and 6.13.2)

9.7.4 Literature Review

In research the literature review is regarded as being essentially preparation of the mind. It follows, that to be serious about this step one has to be evaluatory and reflective as you read and write. Ideally one needs a strong theme which is used to weave an expository and exploratory discourse that unites and builds one's understanding and ideas with what has been written by other authors on your core topic area.

For projects a full literature review is only needed in the case of a study project. For Engineering all that is required is a thorough overview of the application area. So for example, if an application where about Insurance brokerage then all that is required is a description of what brokerage is but only to the level necessary to understand the requirements. See workbook 5 but section 5.2, 5.6, 5.7 and 5.8 should be studied with care.

Structure - many reviews were poorly structured and one often felt that the students had just written down the material as it occurred to them without any thought as to a wider readership.

Theme - often there was no detectable theme connecting the various sections of the narrative and a reader would therefore be forced to guess at how all the various elements were connected.

Value Added - the most common flaw was to see a review that was entirely or almost entirely made up of quotations, paraphrases or summaries so that the 'hand' of the student was not detectable anywhere in the work. Such work is not evaluatory and gives no indication whatever that the student has learned anything of value or indeed anything at all. It is often the case that one feels the student has no notion of the literature being a driver that may mean they have to accept new knowledge, gain further experience, modify existing knowledge or even abandon what they thought was sacrosanct and sadly no belief that their own views and experiences are also important.

Citation Style - two things are evident here. Firstly, one finds that too often citations are limited to the Literature Review. Secondly, the actual style used is very poor and commonly we see the form (Burk, 1992 p45) placed at the end of a sentence or paragraph - this is not acceptable and can only mean the whole paragraph has been paraphrased. The ONLY correct use of this bracketed style is in a passing reference to a text. (See workbook 8)

Worthless Quotes/Paraphrases - it is unfortunately only too common to see an appeal to some text or other for information that tells you either common knowledge or makes an obvious observation and so the citation is worthless and is representative of weak scholarship and laziness where a student is just trying to add a citation because he knows that such things are desirable. For example, quoting an author who says that "Object Orientation is now routinely used in software construction" is representative of common knowledge or quoting an authors who "says change is inevitable" is something that one might regard as obvious.

9.7.5 Research Design

These were often far from satisfactory and often read like a joke delivered without the punch line. The students are taught that essentially there are two phases. The first phase is the process used to get primary data items that are formed into a set. Once the collection phase is completed we move on to the second phase of processing where the set of primary data items is processed to get an answer in the form of expected project outcome. Particular points are:

Research Phases - In many cases students were unable to distinguish the processing needed to get a set of primary data and processing of the set to get an outcome. It is quite common to see these two phases ignored or become completely muddled leading to a poor research outcome because the student loses his/her focus and often appear to have no clear idea what they are doing. The phases are:

Data Definition and Collection - a process or processes used to define and create a primary data set. It typically has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the data and present the data.

Data Processing - a process or processes used to manipulate the primary data set to get the project outcome.

No Outcome - often it seemed as if the student had no idea what project outcome to expect so when one looked at the processing there was no sense that the primary data was being used in any way to generate the required project outcome. See workbook 6 section 6.4

No Situation Actors – this occurs when we have an outcome but no idea who (person or persons) will use it to generate the target effects. See Workbook 6 section 6.5

Primary Data - many students seem to have only a vague notion of what primary data is and will often, very often, confuse or think that primary data is the same as the method of collection. This confusion is often evident with some students thinking that only questionnaire data could possibly be primary data.

Primary Data Definition - Primary Data is new data in the sense that it will not exist as a set until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data set is representative of some aspect of the area under investigation and can be processed to get a defined project outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

For example, one student took the definition and then read through an accounting system manual for his company and extracted all the functions and claimed that was primary data because he was going to use it to define what an accounts package should have by way of functionality but seemed unable to see that the manual had effectively done that already. (See workbook 6 section 6.7)

Research Method Justification - often students could not distinguish between Research Method and Data Collection Protocols. Research Methods are frameworks such as Case Study, Experiment, Action Research and so on. Collection protocols are based on: interview, questionnaire, observation, role playing, seminars, focus groups and so on. The sorts of justifications used are of the form "I have chosen case study because Saunders (2005, p92) said case studies are good..." - this is hopeless and implies no real thought. Justification must be built from a sound understanding of a particular Research Question, its expected form of answer (project outcome) and the Primary Data needs and at least an overview of which method is likely to be best in a given situation. (See Workbook 7)

Practicality - many plans were over-complicated with students trying to use multiple methods and then ending up with masses of data they had no idea what to do with. There is only limited time and so students should be encouraged to focus on just one Research Method although of course several collection protocols may be involved.

Data Collections - in many cases all an examiner was able to see were presented results but often one simply could not tell if any primary data set was involved and the results just seemed to appear 'out of the air'. The marking guide is quite specific and projects must be clear about both processed data and raw primary data sets. Without this we cannot feel confident that students have done any actual research. Typically, the primary data set is placed in an appendix and might be in the form of a summary table of questionnaires results or summarised transcripts. Correspondingly, the processed primary data set is expressed as charts, graphs, tables, reports and so on in the body of the project report.

Processing - this is one of the most disappointing elements. Processing is all about transforming your primary data set into the project outcome. Far too often all we see is the processing of individual primary data items with no attempt or very weak attempts to really supply an answer to the Research Question in the form that was specified.

Location - there were quite a few projects where it was more or less impossible to see where the primary data came from and often this was accompanied by a very ordinary set of results that could have been written by almost anybody with a superficial knowledge of the subject area.

9.7.6 Research Results Processing

There were some very good examples but often this section was very routine and very disappointing.

Repeating - it was very common to see a chart for example, displayed and then underneath the student simply repeated the data that was in the chart in words. Such a practice is worthless. What any data related narrative is supposed to do is to tell the reader what the data means and what implication it might have - that is we expect to see some analysis and evaluation of the data in terms of the Research Question.

Focus - the focus of processing the primary data is to create a kind of transformation that generates from the primary data set the expected project outcome - unfortunately, this aspect was often absent. Typically in a survey for instance we have page after page of charts analysing individual data items but no attempt to sum it all up and reach a conclusion based around the Research Question.

9.7.7 Evaluation and Conclusions

These sections in a lot of student work are indistinguishable. The reason there are two sections with marks attached is because:

Evaluation - here one focuses specifically on the project outcome and research methods - that is we evaluate our product (outcome) and the methods used in its generation. Notice here this is NOT about generating the outcome that would have been done in the primary data processing section

Conclusions - here the attempt is made to say what it all means - that is trying to generalize the findings. So for example, suppose the outcome is about the use of Agent technology in eCommerce web sites then in conclusions one might try to say what a particular project outcome means for any eCommerce site or in fact any website. In a similar kind of way, if a particular application had been built we might try to say whether it might be applicable in other situations or whether some features of the design can be transferred to all applications of that type.

9.7.8 Ignorance of Project Marking Criteria

Many students show an almost complete disregard for the way a project is marked and so often automatically lose marks. Students must therefore carefully study the marking forms so that they know what components are regarded as essential to any project and therefore carry marks. (See workbook 11 or 12 as appropriate)

10. WORKBOOK 10 – FORM: PROJECT SUBMISSION

This form **must** be completed and included in your project submission. If you are unable to tick every box then your work is not ready for submission.

Project Word Count	Exclude appendices. If maximum is exceeded marks may be lost or the project rejected
	The report length is within the stated guidelines (15,000 words maximum excluding appendices)
	I have included all making elements indicated in workbook 11 Or 12 as appropriate and noted the marking guidance notes
	I have studied the guidance notes on common project faults found in section 9.6
	I have prepared two bound copies of all my project work including any separate appendices
	I understand that I may use one or both sides of the paper when printing the report.
	I have included a full contents list, table list and diagram list all numbered consistently
	I have used good quality A4 paper, normally in portrait orientation with a weight between of 80 and 100gsm.
	I have made sure that the pages are in the right order and none are missing
	I have used MS word .doc format
	I have formatted the front cover and title page as required and added the necessary plagiarism declaration.
	All my text is single line spaced at 6 lines per inch/25.4 mm.
	All my main text, including headings is in 12-point font (Arial Narrow is recommended)
	All my text in tables and diagrams is 10-point font (Arial Narrow is recommended)
	All main text is right and left justified
	No headings at whatever level are indented
	Headings are NOT followed by a blank line
	Headings are in the same font and size as the main text but are shown in bold type
	No numbered headings are orphaned (that is all heading must be followed by some text not immediately by another heading)
	I have used a single blank line to separate paragraphs
	All chapters and appendices are numbered sequentially (1, 2, 3,...)
	All subsections are numbered (2.1, 2.2,...) and none of my sections numbers exceed three levels (1.2.1, 1.2.3 ...)
	All my margins: (top, bottom, left and right) are 20mm
	All pages have footers in 10-pt Arial Narrow in form: Page 12 of 97 - J.Letto Student No. 567543 Submission Date: 12.10.07
	I have cited other people's work properly using the Harvard APA format
	I have included all citations in my list of references
	My abstract accurately summarises all of the report, not just parts of it
	All my chapters and appendices start on a new page
	I have included appendices, where appropriate, covering: project specification, Project Plan, Requirements document(s), design document, screen shots, source code, user documentation, test results, evaluation results, questionnaires, etc.
	My supervisor has read each chapter as the work progressed.
	My supervisor has read the whole report
	I understand that indented sentences can be used where appropriate but bullets are not recommended (see 9.3.1)
	I understand that page headers are not required
	I understand that each of my chapters should start with an introductory section that explains what the chapter is about
	I understand that each of my chapters should end with a summary and a helpful link to the next chapter
	I have fixed a copy in .doc format of the project document and any appendices on floppy/CD/DVD to my project submission
	All my primary data (including requirements data) is original to this study and collected by me for this specific project purpose
	My primary data collection is available in the project document or appendix (if necessary in edited or summarised form)
	Engineering Projects only - I have included an executable file of my application on an attached floppy/CD/DVD
	Engineering Projects only - Application Operating instruction are on the attached floppy/CD/DVD as well as in the appendix
	Engineering Projects only – In my application I have not used illegal copies of any software or included any software where there is an expiry date which may render the application inoperable in the future.
	Engineering Projects only - I understand that the copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If, and only if, this is not possible then I have included in my project a supervisor signed set of screen shots in the appendix confirming that he/she has viewed the application in action.
Signature of Student.	Date.

11. WORKBOOK 11 – FORM: STUDY PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

STUDY STYLE		Postgraduate Project Marking Form						STUDY STYLE	
Name of Student							HEMIS No.		
Brief Project Title							Total Mark	%	
Recommendation	If the mark awarded is a fail circle you opinion						Re-Work	New Topic	
Name: Supervisor									
Name: Marker									
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker		
Project Unit	PJ.NCC								
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected						
External Examiner	N	Y	Refer to the External Examiner (if “Y” add comment in section G)						
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit						
References: See Workbook 11 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes									
Section A - Marks for Planning and Preparation							Weight	Mark	
1.	Project specification, including project plan						5		
2.	Review of the topic area literature						15		
Sub-Total							20		
Section B - Marks for Project Introduction									
3.	Presenting problem and its exploration including the Research Question						5		
4.	Discussion of the project's scope, scale, aim and objectives						10		
Sub-Total							15		
Section C - Marks for Project Primary Data Research and Outcome Generation									
5.	Selection and justification of Research Method						5		
6.	Primary data collection plan including data specification						10		
7.	Primary data processing plan to get expected outcome						10		
8.	Presentation and discussion of the collection of Primary Data						10		
9.	Description and discussion of main project outcome						10		
Sub-Total							45		
Section D - Marks for Project Evaluation and Conclusions									
10.	Evaluation of the project outcome (Project Specific)						5		
11.	Evaluation of project practice (Project Specific)						5		
12.	Statement of conclusions and reflections (Project Generalisations)						10		
Sub-Total							20		
Section E – Qualitative Assessment matrix based on University Grade Criteria									
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words			
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless			
3.	Report structure	very poor	poor	satisfactory	good	excellent			
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report			
5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours			
6.	Project idea	trivial	easy	modest	challenging	Difficult			

7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Primary data collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Data processing	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
14.	Main project outcome	Worthless	obvious	useful	original	exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Study Format Marking Form Guidance notes These notes must be read in conjunction with the grade criteria and associated notes found in Workbook 14.
Section A - Marks for Planning and Preparation
1. Project specification, including project plan
Reference: Workbook 3 section 3.3 for general notes and section 3.5.2 for an example specification
Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.
2. Review of the topic area literature
Reference: Workbook 5 section 5.2 and 5.6 in particular, Workbook 8 and Workbook 9 section 9.6.4
Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers and generally be focused on the central project topic. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.
Section B - Marks for Project Introduction
3. Presenting problem and its exploration including the Research Question
Reference: Workbook 3 section 3.3 and 3.5.1, Workbook 6 sections 6.2, 6.6 and 6.7 and Workbook 9 section 9.6.1
All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Research Question with a defined form of answer (project outcome). It is very common to see an expression of a problem as "my problem is to find a solution to..." or expressed in such a way that it is in effect a solution and such expressions are indicative of students who do not know what the problem is but nevertheless know what the solution is. Similarly, students who list multiple problems, have no Research Question (or a very poor one) and do not discuss the form of outcome expected are embarking upon projects where there is no clear focus and these typically fragment when it comes to the core research and one most often cannot find any clear project outcome later in the work. It is also useful at this stage if there is some indication of the Basic Activity for Generating Data (BAGeD) so that one can feel sure that the student is aware of what primary data they need in order to generate the intended outcome.
4. Discussion of the project's scope, scale, aim and objectives
Reference: Workbook 3 section 3.5.2 (example), Workbook 6 section 6.1 and Workbook 9 section 9.6.3.
Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition, expected form of outcome and Research Question all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.
Section C - Marks for Project Primary Data Research and Outcome Generation
5. Selection and justification of Research Method
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a rational and thoughtful choice of Research Method focused on resolving the stated problem theme. In practice this implies a consideration of primary data needs, location of primary data and the collection protocols that might be used. Markers should guard against rationales that amount to saying that some text book or other said method X or Y was good for certain kinds of scenario – that is copies of generalisations about Research Methods found in books do not amount to a rational for a specific research situation. Furthermore, markers need to feel confident that the student understands the distinction between a Research Method and the collection protocols used within them.
6. Primary data collection plan including data specification
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
This is a crucial stage in a research based project and markers must be confident that the plan is practical. A marker must look for a clear core activity represented by a statement about of BAGeD and that core activity should be surrounded by whatever other processes are needed to ensure reliable collection of the primary data. The whole primary data collection plan has four steps which must be visible in the project document: data definition, data location, data collection and how the whole collection of primary data is to be presented. Markers should also take care that the formation of a collection of primary data is not confused with the processing of it to get the stated project outcome.

7. Primary data processing plan and presentation of the expected outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for clear evidence that the student has taken the collection of primary data they obtained earlier in the project and now process that whole collection to get to a clear presentation of the project outcome. It is therefore important that markers can see what processes were applied to the collection of primary data to get the outcome – without this process visibility there is no evidence as to how the project outcome was actually obtained. Markers should be wary of processing plans that say such things as “I will look at the data” or “I will analyze the data” or “I will use SPSS” as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same data collection they could apply the same processes and get the same or at least a very similar outcome.
Markers should also be aware that very often students will often process individual data items – such as might be found on a questionnaire, but never get to a point where the stated project outcome is derived from the collection of data.
8. Presentation and discussion of the collection of Primary Data
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for visible signs of the collected primary data. The primary data collection is most often presented in tabular form in the appendix and might be displayed as graphs, charts, tables or diagrams in the main project document.
9. Expression and description of main project outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
The intended project outcome must be clearly visible – for example if the intended outcome is a model then that must be clearly shown in some acceptable form and be based on the processing plan outline in section 7. Markers must therefore take great care that the presentation of primary data and the processing of individual data items in the collection are not offered as a substitute for the student generating the intended project outcome.
Section D - Marks for Project Evaluation and Conclusions
10. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project outcome so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution (project outcome) or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project outcome. The section is not intended for vague thoughts about the topic but a considered evaluation of the project outcome when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
11. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate here. This section is important as this is where one expects to find some information on what the student has learned about the way they work and the tools they used. It is unfortunately often the case that students have very little idea about what they did apart from stating vague activities such as “look at”, “analyze” or “use SPSS” so without anything concrete to evaluate they resort to the routine and say “the survey process went very well” or “my case studies generated useful data” or else they simply ignore this form of evaluation altogether. Evaluation of project practice is difficult and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking ‘how did I do it’, ‘was it successful’ and ‘could I or should I on reflection have done it another way’. Additionally, one needs to be aware of any constraints involved, including time management and particular skills that might have impacted on the use of best possible practices.
12. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a project outcome was based on case studies and the outcome was a review of IT outsourcing in Hong Kong then here we might expect to see the student consider the outcome he obtained which refers to Hong Kong and then consider and discuss whether that outcome has wide applicability, for example, to China, South East Asia or even the world as part of a Global economy or is it just specific to that local situation. Essentially, one is asking what do the outcome ‘mean’ when set in a wider setting. It follows that the focus of awarding marks here is for project generalisations.
It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such as future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

12. WORKBOOK 12 – FORM: ENGINEERING PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

ENGINEERING STYLE		Postgraduate Project Marking Form				ENGINEERING STYLE	
Name of Student						HEMIS No.	
Brief Project Title						Total Mark	%
Recommendation	If the mark awarded is a fail circle your opinion					Re-Work	New Topic
Name: Supervisor							
Name: Marker							
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker
Project Unit	PJ.PEA						
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected				
External Examiner	N	Y	Refer project to the External Examiner (if "Y" complete section G)				
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit				
References: See Workbook 12 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes							
Section A - Marks for Planning and Preparation						Weight	Mark
1.	Project specification, including project plan					5	
2.	Review of the application/product area and its client/business setting					10	
Sub-Total						15	
Section B - Marks for Project Introduction							
3.	Presenting problem and outline proposal					5	
4.	Discussion of the project scope, scale, constraints, aim and objectives					10	
Sub-Total						15	
Section C - Marks for Project Primary Data Research and Outcome Generation							
5.	Detailed requirements collection plan based on proposal					5	
6.	Analysis of requirements: functional, performance, technical and usability					5	
7.	Presentation, analysis and discussion of the design					10	
8.	Discussion of build process and design implementation					10	
9.	Application testing process and results					5	
10.	Implementation plans					5	
11.	Attributes of the project artefact (e.g. quality, reliability, etc)					10	
Sub-Total						50	
Section D - Marks for Project Evaluation and Conclusions							
12.	Evaluation of project product against requirements (project Specific)					5	
13.	Evaluation of project practice (project specific)					5	
14.	Statement of conclusions and reflections (project generalisations)					10	
Sub-Total						20	
Section E – Qualitative Assessment matrix based on University Grade Criteria							
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words	
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless	
3.	Report structure	very poor	poor	satisfactory	good	Excellent	
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report	

5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours
6.	Project idea	trivial	easy	modest	challenging	difficult
7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Requirements Collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Design Expression	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
15.	Artefact Evaluation	worthless	obvious	useful	original	Exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Engineering Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.1 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the application/product area and its client/business setting

Reference: Workbook 5 section 5.2 and 5.6, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers. In Engineering projects the expectation is that the review will focus on the application area and be in enough detail to at least understand and gather the requirements. It is permitted to include technical material if they have a special or unusual significance to the application area but in so doing students must be aware that the routine inclusion of what at this level might be regarded as common knowledge in computing/IT will not attract any marks. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and Outline Proposal

Reference: Workbook 3 section 3.3 and 3.5.1 Workbook 6.2 and 6.5, Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Application Outline expressed as a functional description. It is very common to see an expression of a problem as "my problem is to find a solution to..." and this is indicative of students who do not know what the problem is but nevertheless know what the solution is. Students who list multiple problems, have no functional description (or a very poor one) are indicative of projects where there is no clear focus and these typically fragment when it comes to requirements gathering and often end in a very trivial application. Markers should be aware that students may avoid giving a functional description and instead offer a generic architectural one and this must be penalised as the student clearly does not know what function the application supplies

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.1 (example), Workbook 6 section 6.11, 6.9 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition and Application Outline all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Detailed requirements collection plan based on proposal

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful consideration of the Requirement Gathering process focused on obtaining sufficient information to build the intended application and resolve the stated problem theme. In practice this implies a consideration of application functions, location of requirements data and the collection protocols that might be used. Normally in research one would expect a rationale for the choice of Research Method but for Engineering projects it is taken for granted that the method is requirements gathering. Instead one should look for a clear focus on constructing a feasible and comprehensive requirements document based on the application outline. Furthermore, markers need to feel confident that the student understands the distinction between Requirement Gathering as a Research Method and the collection protocols used within it.

6. Analysis of requirements: functional, performance, technical and usability

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers must look for a clear Application Proposal and a requirements catalogue. Here one needs to see a discussion of the requirements to ensure they are credible (realistic), comprehensive, complete and stakeholders have been considered. One might also usefully consider the approach that was taken to gain them and whether they are of the form of strategic, tactical or operational.

7. Presentation, analysis and discussion of the design
Reference: Workbook 9 sections 9.6.5 and 9.6.6 and Workbook 7 section 7.9
Marks are awarded here for clear evidence that the student has taken the requirements obtained earlier in the project and processed them to get a suitable design. Therefore, markers must be able to see a clear link from requirements to design and where necessary observe how the requirements were processed. Markers should be wary of processing plans that say such things as "I will look at the requirements" or "I will analyze the requirements" as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same requirements they could apply the same processes and get the same or at least a very similar outcome.
8. Discussion of build process and design implementation
Reference: Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for a rational discussion as to what architecture, components, languages and tools and so on are needed to best implement the design. This discussion may also imply the various situation constraints have to be considered as well.
9. Application testing process and results
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers must look for evidences of a testing plan and a consideration of test results. Typically the plan and results are placed in the main project document in outline form with the details in an appendix. Often students will just discuss white or black box testing or regression testing or something similar but without any actual test plans or results – in such cases marks should not be awarded as these materials is considered common knowledge at this level – however brief references to it are permitted.
10. Implementation plans
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a comprehensive implementation plan – it need not be extensive or in minute detail but it should cover installation, user training, data conversion/loading, change over, user acceptance and hand-over.
11. Attributes of the project artefact (e.g. quality, reliability, etc)
Reference: none
The intended project application must be clearly visible and available to run directly from a disc or DVD. Markers are to award marks based on their perception of the general quality of the application if they were to put themselves in the place of a user. Assessment may then consider colour scheme, ease of use, operating instructions, presentation (does it look as if its finished), speed, etc.
Section D - Marks for Project Evaluation and Conclusions
12. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project application so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project application. The section is not intended for vague thoughts about the situation or application but a considered evaluation of the project application when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
13. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate. This is where one expects to find some information on what the student has learned, the way they work and the tools they used. It is often the case that students have very little idea what they did apart from being able to state vague activities such "look at" or "analyze" so without anything concrete to evaluate they resort to the routine and say "the survey process went very well" or "the UML modelling was straightforward" or else they simply ignore this form of evaluation. Evaluation of project practice is difficult because the student must ask searching questions related to process success and the notion of good and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way' or "what were my constraints".
14. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a an application was for eCommerce selling shoes it might be possible to ask what aspect of that application could be re-used to sell other product. It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

13. WORKBOOK 13 – FORM: PROJECT MARKING RECONCILIATION

The form shown below is included for reference only so that you can see how your project will be marked.

Project Mark Reconciliation Form		Final Agreed Mark (%)	
Name of Student			
Brief Project Title			
Name: Supervisor			
Name: Second Marker			
Name: 3rd Marker			
<p>Cause – in this box, describe, for each applicable section, why the marking disagreement occurred.</p> <p>Rationale – in this box, If a mark can be agreed, explain the rationale used to reach agreement. Please note that it is only necessary to agree the total mark for each section not individual category marks.</p> <p>Irreconcilable - If you cannot agree a mark leave rationale blank and it will be filled in by a third marker who will place a tick in the small square box.</p>			
Section A - Marks for Planning and Preparation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section B - Marks for Project Introduction		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section C - Marks for Project Primary Research and Outcome Generation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section D - Marks for Project Evaluation and Conclusions		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			

14. WORKBOOK 14 – SUPERVISION AND MARKING GENERAL GUIDANCE NOTES

1. **Presented Work** - Marker's are reminded that any marks awarded must be solely based on the assessment of work presented within the mark categories listed on the mark forms. It is not permitted to award marks for "hard worker" or "tried very hard" or "was a good student" or any similar observation as there are no relevant mark categories and this kind of criteria is almost impossible to evidence.

When an Engineering artefact is presented it should be viewed in action to ascertain the mark for "Attributes of the Project Artefact". The copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If this is not the case then markers must assume that there is no evidence for the application and set the mark accordingly.

2. **Word Count** – on the project submission form there is a space for a word count (excluding appendices) and if this is exceeded then it is indicative of a deliberate attempt to go beyond recommendations and you may therefore find that it leads to laboured descriptions or inclusion of irrelevant material in the project document and you should therefore mark accordingly.
3. **Structure** – mark categories do not necessarily represent chapters in a project document and so Marker's need to be aware that a particular project may be structured in a way that does not correspond to the sequence presented on the mark forms (though it is recommended to do this when possible). However, all the elements on the marking form must be visible in the work presented.

Although it is recommended that the mark form sequences be followed in the project document that does not mean that there has to be a chapter for each mark category. Students, therefore, should be encouraged to merge sections in order to produce a concise document. For example, it is perfectly possible and reasonable to merge the two evaluation sections and conclusions into one chapter as long as the relevant mark elements are still visible.

4. **Appropriateness** - any work presented must be within the prescribed subject area for the course. If a marker suspects that this is not the case then they should consult with the relevant course leader for clarification. In such accepted cases markers must regard the primary data and its processing as not being appropriate and mark with that in mind.
5. **Evidence** - the project report or appendix must contain sufficient evidence that the core project research work has been done (not the literature review). That is, in the case of study project a marker must be able to see the primary data collection appropriately presented (usually in an appendix). In the case of Engineering projects it must be possible to see a suitable requirement document or catalogue (possibly in the appendix). Once the primary data is visible then it must also be possible to see how that data was transformed into the intended project outcome.
6. **Literature Support** - when marking Literature Reviews their content must be seen to be focused on the topic area and address clearly the associated problem theme without any irrelevant material with the intention of offering a concise discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (see section 5.1)
7. **Grade tables** - markers must be aware of the criteria associated with awarding a given overall mark as they may be required to justify it to the UAB in terms of the criteria stated in the table shown below.
8. **Process** – when marking it is important that the process used to get an outcome by the student is visible in the project document. In practice this means that it is possible to perform the following trace: presenting problem, discussion of how problem might be resolved, suggested form of project outcome, research design and execution, generation of stated outcome, evaluation and conclusions – viz:

Engineering – typically, the process starts with a business related or technical problem theme leading to a research plan for the collection and discussion of requirements and their transformation into a suitable design and associated architecture. From this there should follow a build, implement and testing process with the whole project completed with suitable project specific evaluations and conclusions containing generalisations.

Study – typically, the process starts with a business or strategic IT related problem theme leading to a research plan for the collection and discussion of primary data and its transformation into an outcome that would resolve or go some way to resolving the stated problem theme. The whole

project is then completed with suitable project specific evaluations and conclusions containing generalisations.

Marks	Master's Level Grade Criteria
70 – 100	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Excellent work - able to express an original reasoned argument in a lucid manner by reviewing & critiquing a wide range of material. Original, critical thinking based on outstanding insight, knowledge & understanding of material. Material contributes to current understanding & is of potentially publishable quality in terms of presentation and content ▪ Wide reaching research showing breadth & depth of sources
60 – 69	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Clear, balanced coherent critical & rigorous analysis of the subject matter. Detailed understanding of knowledge & theory expressed with clarity ▪ Extensive use of relevant & current literature to view topic in perspective, analyse context & develop new explanations and theories
50 – 59	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Detailed review and grasp of pertinent issues & a critical contextual overview of the literature. Thorough knowledge of theory and methods & uses this to underpin arguments and conclusions ▪ Confidence in understanding and using literature
40 – 49	<ul style="list-style-type: none"> ▪ Demonstrates grasp of key concepts & an ability to develop & support an argument in a predominately descriptive way with valid conclusions draw from the research ▪ Familiarity with key literature which is cited and presented according to convention ▪ Logical & clear structure, well-organised with good use of language and supporting material
0 – 39	<p>FAIL – Some knowledge of relevant concepts & literature but significant gaps in understanding and/or knowledge. Little attempt at evaluation, conclusions vague, ambiguous & not based on researched material. Limited or inappropriate research. Deficits in length, structure, presentation &/or prose.</p>

This form may be used by you to feedback to the University your experiences in the courses. It is normally sent to your tutor at the end of the course.

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16. WORKBOOK 16 – USEFUL BAGeD WORDS

These words and their definition may be used to formulate your BAGeD idea is a research design

Account for - Explain and clarify something by giving reasons

Analyse - Resolve something into its component part, or examine critically and minutely.

Appraise - This is best thought of as something like forming an opinion about something. It might be quite simple such as forming an opinion as to whether something is good or bad but more often that not it's about forming an opinion about something after assessment or evaluation with regard to what can be done - so we might appraise whether a process for example should be left unchanged, modified or made redundant.

Assess - Determine the value of something. Similar to evaluation but it is often useful to think of evaluation as a qualitative process and assessment as a quantitative one.

Catalogue - This means to create an ordered collection of some sort where there is a logical order and the essence of the task is to enumerate and describe

Collect - This is very simple as all one does is to identify the data and literally collect it as you see it. So if I were looking for SPAM instances then as soon as I find one I just file the whole SPAM email away for later processing.

Compare - Look for similarities between one or more things.

Compile – similar to list but here the implications is you search many sources but in doing so having to make decisions in the process

Contrast - Look for differences between one or more things.

Criticise - Make a judgement, backed by a discussion of the evidence or reasoning involved, about the merits of theories, opinions, .

Define - State the exact meaning you are attaching to a word, phrase, idea, process etc

Describe - This may be used freely to describe in detail situations, events, opinions, feelings and so on.

Differentiate - Look for elements that would clearly differentiate between two or more things

Discuss - Explain something by giving two sides of the argument

Evaluate - In some cases one might want to look at events or people or processes in order to form an evaluation and that collection of (usually) small evaluations form our primary data.

Examine - Look carefully at the details of an argument, theory, or plan etc

Explain - this is about saying why something is. So one can describe an event but also explain why it occurred

Explore - You can use this word but we are always exploring so it must be used with care. Typically, in these cases one starts with a model of some kind and uses that to inform the exploration process. For example, we might have a theoretical process map and we use it to explore various working processes to see if we can find flaws or weaknesses and then those descriptions of flaws or weaknesses become our primary data.

Illustrate - Here one is trying to find a way to express in a very pointed way some situation or thing. So one might identify an instance of SPAM and then illustrate why it might be harmful so adding poignancy to the example you have extracted. Mostly, it is best to think of illustration as a way of giving an example but in that example you want to make just one clear point.

Interpret - The essence here is that one is typically observing something to describe it but also to find some meaning in what is being done. This is often used when looking at social groups or situations where it is not always obvious why certain actions occur

Justify - Show adequate grounds for decisions and conclusions and answer the main objections likely to be made about them.

Link - This is often a neat way of dealing with some types of data where you think there is a relation but the relation itself is not known with any certainty. One often finds this kind of activity evidence in a matrix formulation or representation.

Outline - Give the main feature or principles of an object, omitting minor details and emphasising structure and arrangement

Portray - This might be a useful verb if you were looking for types in a study. For example, if you were looking for people who get involved in illegal downloads one might want to portray them in some way.

Profile - This is similar to a description but it focuses on just the key points. For example, if we were looking for best practice in a situation then we might start by just profiling a given task – that is we outline the main steps and rationale to start with. The idea is similar to an outline but implies deliberate selection of certain aspects.

Represent - Sometimes you might plan to build a representation of some event as your primary data. For instance, if one was looking for security awareness in employees then of course one cannot "see" it or collect it as such. In these cases we must try to find a way of representing an awareness level or feeling and that representation forms our data.

Summarise - Give a concise and lucid explanation or account of something, presenting the chief factors and omitting minor details and examples

Synthesise - Resolve something into a whole from its component parts.

Student Workbook Pack

Research Methods for Master's Students

School of Computing

CN.002 Release 3.2c December 2006 ©

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1. WORKBOOK 1. MASTER'S PROGRAMME OUTLINE

The Master's programme has two units of study: Research Methods and Project and the online programme notes together with this workbook pack cover all the information you need to complete it.

1.1 University Expectation

The University expects that when students submit work it is the very best they can do. In practice this will mean several things and all of them will be examined when work is assessed.

English – written English must be of a Master's standard and that means an IELTS score of at least 6.6 (or equivalent) is needed. If submitted written work is judged to be below this standard, students will NOT be allowed to progress to the project stage no matter what their actual language certification states.

Structure – work must be well structured and coherent. In practice students will most often work with a pre-defined set of headings and they must be used explicitly without deviation in their implied content.

Preparation – good work can only be produced if there has been adequate preparation. This will mean a thorough study of any and all references and exercises. Study does not mean a quick read through the notes or academic arrogance which says "I don't need it" or "I know all this stuff". This preparation also means working through the topic idea itself so that one becomes expert in a particular field.

Instructions and Guidance – all the work you submit will have to meet various standards in terms of layout and format and students are expected to following such guidance diligently.

Using other people work – all work submitted must be the student's own but within that work they may refer to the work of others but all material used must have proper attribution. Thus, if another author's work is copied, paraphrased or summarised it must be properly cited. Students need to understand that paraphrasing (putting things in your own words) and summarisation will amount to plagiarism if not properly attributed. This is a very serious matter and the rule with regard to copying is very simple. If 6 or more words are copied then the sources must be cited and if 10 or more words are copied without attribution then that is regarded as proof of plagiarism

Student's Own Work – the submitted work must be entirely constructed by the student and to do this it is necessary to weave into ones own ideas and thoughts the work of others. One may use the work of others to lend support to a proposition, or to include a definition or an explanation and so on. In other words it is not so much a question of how much of another person publication one uses but what one does with it in constructing ones own research work. In short scholarship is acknowledging and using the work of others whereas plagiarism is using the work of others and in so doing attempting to fool the reader into thinking it is ones own.

Respect – when writing one is doing it for another person to read and it's therefore a grave sin in those circumstances not to offer the very best one can produce.

Need - only quote, paraphrase or summarize when it is clearly adds to what one is saying and it is not just common knowledge or obvious. The key task is to formulate ones own ideas, in your own words by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

1.2 Overview of Unit Assessment

The two units: Research Methods and Project are assessed separately and students must in each one gain at least a pass grade in order to qualify for a Master's award. The assessment artefacts are.

Research Methods Unit (15 Credits)

The Research Methods Unit will be taught over approximately 12 weeks and assessment details will be published to you early in the Unit. The assessments are as follows.

Assessment 1a - development of a project specification plus a short literature review

Assessment 2 - a coursework on statistics.

Project Unit (45 Credits)

The Project is an extended research exercise where students will be guided by a personal supervisor. For students who have passed assessment 1a, approved projects will start a few weeks after the end of the Research Methods Unit and last for at least 18 weeks. There is only one assessment as follows:

Assessment 1b – prepare a full research based project document based on the specification developed in assessment 1a. The details of what is required in the Project itself can be found in Workbook 9.

1.3 Research Methods Unit Assessment Overview

This unit of study requires about 150 hours of effort from each student and will cover research principles, research ideas, research techniques as well as statistics. Assessment details and due dates will be made available early in the study period for the Unit in WebCT.

1.3.1 Assessment 1a – Preparation, Literature Review and Project Specification Development

The first unit event will be related to the development of a project specification and is in two stages.

Part 1 – Project Proposal Approval (up to 10 marks) – when the Research Methods unit begins students need to gain approval for a project title/idea. The university will supply a list of ideas or students may bring one of their own as long as the related project outcome has a strategic business IT dimension, it is new work, it involved learning in IT and it is a Master's level activity. In the approval process students have to write a short submission to a set format and send it in a plain email to the Research Methods tutor whose decision is final. This process must be completed by the due date set in the Assessment 1a papers (normally about week 6)

Students are permitted ONE attempt to gain marks in each cohort at this stage and one of three outcomes is possible:

Approved – the submission, whilst not necessarily being perfect, meets all the above project criteria and the outline is judged good enough for the student to begin work on the specification. About two weeks after approval is granted a supervisor will be allocated who may assist you in finalising the project Specification.

Permitted – the submission has a suitable idea but its construction is judged to be of poor quality but the student is given the benefit of the doubt and is expected to make good in the specification. No supervisor will be allocated and final approval will be depended on the quality of the final specification.

Rejected – the work is received after the due date or submission does not meet the criteria for a project in this degree and a new topic must be chosen and a new application made. Most often this is because there is no Strategic Business IT, the project research is regarded as trivial or plagiarism is detected.

Part 2 - Online Self Tests – these will be available at set times for a set duration every week for the first 5 weeks. Typically 1 mark will be awarded for each test in which you score 65% or better. Students should note that missing any test for whatever reason means the recorded score will be set to zero automatically as there is no provision for taking the test at another time or by another method.

Part 3 – Short Literature Review and Specification Approval – based on an approved or permitted project proposal students prepare a short literature review and full project specification which must be posted into a WebCT drop box on or before the assessment due date. The Research Methods tutor will review the work and write a feedback report for each student. The specification and feedback report will then be placed before a University panel who will decide whether it is appropriate for a Master's level project. At the end of the specification approval process one of four outcomes is possible:

Approved – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report and specification. Approval will not mean that a specification is perfect and it is expected that students will take note of any feedback given by the Research Methods tutor or the allocated supervisor to further refine it.

Approved Conditionally – students with an approved project proposal will have their named supervisor confirmed. Students with a permitted project proposal status will be allocated a supervisor. The supervisor will be automatically sent a copy of the feedback report. Conditional Approval means that there are some significant concerns that must be addressed before work begins and students are expected to redraft their specification, based on feedback given by the Research Methods and in discussions with the allocated supervisor.

New Topic – this means that a student specification has been rejected in its entirety and another topic must be chosen and work must begin again by seeking approval for the new topic before writing a new specification for submission in the next available cohort. This action is most often used when the University decides that the work is trivial, or the work has no significant IT content, or the student has submitted a specification without gaining approval for the topic, or plagiarism is identified.

Plagiarism is Identified – no approval is given and the relevant student work is subject to review by a disciplinary panel. Plagiarism is a form of deliberate deception in order to gain advantage and will always be treated with the utmost seriousness and may even result in students being dismissed from the course.

1.3.2 Assessment 2 - Statistics Coursework

This is usually a set of questions and mainly deals with quantitative data. The submission date will be published to you.

1.3.3 Calculation of Research Method Unit Mark

The overall mark for the Research Methods unit will be calculated as a weighted average for assessment 1a and 2 with the actual calculation being $0.7 \times \text{Assessment 1a percentage mark} + 0.3 \times \text{Assessment 2 percentage mark}$ in which a pass is indicated by scoring 40% or more overall.

1.4 Assessment 1b - Master's Project

This unit of study requires about 450 hours of effort, guided by a University appointed supervisor and based on the specification developed earlier in the programme. The actual project document must be supplied in the form shown in section 9 of these notes and is expected to be of about 15,000 words maximum (excluding appendices).

Once allocated a supervisor, students will be asked on what date they wish to submit their project. The only rule regarding project activity is that it must last at least 18 weeks and no more than 2 years but it will be a matter for students to negotiate with their supervisor and the University to agree a submission date. Students are allowed to make small changes to the specification during the project process but they must be approved by the supervisor and must not amount to a change of the topic that was approved.

2. WORKBOOK 2. RESEARCH METHODS CHAT AND STUDY PLANS

This is a general plan for study for this course. Chat sessions are important because they are collective and interactive and typically focus on just one important feature of research and to get the best out of the course students need to prepare properly. That means reading the notes, doing the multi-choice tests that go with each chapter, studying the Workbooks and contributing if you can to the discussion boards.

2.1 Contact Mechanism

Contact with students is through email, discussion boards or chat. Email is very important and you should ensure that you use an Internet based service so that you can get mail almost anywhere. It is good practice to create an email account just for the duration of the course and a common choice is GoogleMail because the storage space is, for all practical purposes, unlimited. If you are not able to create a GoogleMail account let me know and I will send an invitation to you. It is important that only ONE email account is used for communication and that address is made know to the Research Methods tutor as follows.

Whatever, mail system you use it is advisable to set mail forwarding from both your WebCt accounts to your personal one to ensure that you get mail as soon as it available. It is also useful if students have a Skype or IM account as many tutors allow direct access if they are online. Skype is preferred since chat, voice and video are all catered for and during contact one does not get bombarded with advertising. Internet email services vary considerable but my recommendation is that you only use a service that:

- Provides a virtually unlimited storage capacity
- Guaranteed to work from almost any location: hotels, Airport, etc
- Allows you to set a mail forwarding address (most services do not so check this with care)
- Provide quality SPAM filtering, virus checking and is not on the SPEWS blacklist
- Allows POP redirection (so you can use Outlook and send from databases etc)

2.2 List of Workbooks Sections Available

Here is a list of all the workbooks in this pack. Students must read them as the course progresses and tutors will expect a committed familiarity with what they say.

No	Workbook Name	Comments
01	Master's Course Outline	General overview of course and assessment structure
02	Research Methods Chat and Study Plans	Lesson plans for the chat sessions and student study plan
03	Project Specification Notes and Examples	Shows what a submission should look like with some helpful hints
04	Sample Literature Review and comments	Shows what a submission should look like with some helpful hints
05	Literature Reviewing	Guidance on constructing a review
06	Major Project Elements	Notes on writing a clear aim and a set of corresponding objectives
07	Basic Research Methods Checklist	A list of several possible research methods for quick reference
08	Bibliographic Referencing Harvard APA	Notes on how to use and cite source literature
09	Writing Up a Research Project	Sample content outlines on how to write your project document
10	Project Submission Form	A checklist to use before project submission
11	Marking Form Study Format	A copy of the form use to grade your project submission for reference
12	Marking Form Engineering Format	A copy of the form use to grade your project submission for reference
13	Project Mark Reconciliation Form	A copy of the form to reconcile marks when markers cannot agree
14	Supervisor/marker notes and grade criteria	Use by supervisors and markers to assess project work
15	Unit Level Feedback	Form that allows you to give feedback on each unit you study
16	Research Methods Master Notes	Complete course notes as a pdf file (not in this pack)
Table 1. List of Workbooks		

2.3 Complete Study Plan

Students must work in a committed way for the 12 weeks during the Research Methods unit and submit the work required on the set dates – there will be no extensions given other than for sickness or other indisposition (in which case students need to complete an ECF and provide documentary evidence of incapacity). Failure to deliver on time without permission will mean that the student unit result will be recorded as a fail. For the whole course the timings in hours are approximately as follows:

Course Element	Time	Comments
Chat Sessions	25	Including preparation and summarizing the chat log
Regular Visit to Site	25	For email and discussion board
Study Notes/Text Book	35	Including making notes and doing the tests
Preparing Submissions	65	Including reading the relevant workbooks and topic details
Table 2. Overall Research Methods Unit Study Plan		

2.4 Recommended Timings for Completing the Research Methods Work

Please look at the following list of times for preparation and carefully plan a way through this unit using these estimates.

Course Element	Time	Comments
Statistics Questions	20	There will usually be 4 questions for you to work through.
Literature Searching	10	The key to a successful submission of the assessments is that ones mind is fully prepared with all the knowledge needed.
Task Description	5	Here students prepare a project proposal: the research question, the form of answer expected, the Basic Activity for Generating Data, data specification and decision on a research method.
Project Idea Approval	5	The format used for this can be found in the Assessment 1a description
Research Plan	5	Here students prepare a plan for collecting primary data. This is not literature searching, it is new and original research
Short Literature Review and Project Specification	20	A partial short literature review and comment is provided in Workbook 4. The Project Specification format is presented in Workbook 3.
Table 3. Coursework Submission Plan		

2.5 Recommended Five Week Development Plan

In this course students must write a project proposal as soon as possible using the format set out in Assessment 1a. However, the basic project idea must be developed and refined carefully and typically it will be done in the sequence shown in table 4 where items in blue are specific to Engineering and items in red specific to study projects. Typically this refining process start is week 3 of the course

There is NO short cut in this work and the standards are very high. The expectation is that you will read and study the notes, examples and exercises with dedication and care. Failure to study with care is usually obvious in the quality of the work prepared, so work hard and think through carefully all the steps below – there is NO substitute for thinking your own idea through. There are plenty of examples to guide you but these examples are not templates they are there to help you gain understanding and not as some sort of quick fix to the work.

If the University sees in your work that all you have done is copy the example substituting a few words here and there then it is very likely your submission will be rejected. The University is looking for students who are thoughtful and careful in their work and through a process of hard work each student must demonstrate commitment high standards – nothing else is acceptable.

Week	Work Recommended
2	<p>Topic Area Research – this is about thoroughly understanding the topic area in which your problem is set. For example, if one was looking on Inventory Management using IT in a fast moving retail environment. that is where your literature research efforts are to be directed. So one would look at inventory management itself, warehouse based systems, shop shelf systems, POS systems, tracking fast moving but small value items, restocking, forecasting, re-ordering and so on. The idea is that you take time to think of all the aspects of the topic and then you try to become knowledgeable in them. There is no short cut here and the work must be done thoroughly and with commitment.</p>
3	<p>Presenting Problem Definition – every project will be based on a real-world problem of some kind. Student must define the problem as accurately as possible and that will be the theme of this first work element. Notice the intention is to have just ONE problem definition. (See Workbook 6 section 6.2 and 6.5)</p> <p>Target – this is the intention of solving the problem itself – that is what real-world benefits will result. For example, the problem might be about accuracy in inventory records and that would imply that if we can find a suitable project outcome that can be used to alleviate that situation then it will results in the target of for example reduced inventory costs. Problem and target are two side of the same idea. (See Workbook 6 sections 6.3)</p> <p>Research Question – here one tries to encapsulate the problem definition and ones theorising into a concise and lucid question that will form the focus of the research effort. (See Workbook 6 section 6.7 and 6.9).</p> <p>Theorizing based on the problem Theme – here one theorises about possible causes of the problem and corresponding solutions. In the case of inaccurate inventory records we might theorize solutions as being based on: production of a training plan for staff, feasibility report on possible use of technology, development of a sales policy and so on.</p> <p>Project Outcome Form – during theorization choose what might be regarded as a best solution and this becomes the single outcome intended for a project. For example, if we take the problem mentioned above of inaccurate inventory records then a project outcome could be a feasibility report on the use of RFID as this might be seen as a way of solving/partially solving the stated problem. (See Workbook 6 section 6.4 and 6.7)</p>
4	<p>Primary Data Definition Outline – the primary data definition is affected by means of the BAGD and it needs to be focused on the problem definition and the expected form of answer. (See Workbook 6 section 6.6, 6.8 and 6.9) In Engineering projects the outcome will be an application of some kind and that needs to be described.</p>
5	<p>Aim and Objectives – in the aim and objectives you sharply focus ones project by stating the means whereby one gets the major project outcome by a series of minor ones in order to achieve the project real world target. Of particular significance here is that the distinction between a project outcome and a project target is thoroughly understood. (See Workbook 6 section 6.11)</p>
6	<p>Research Design – this is the core of any project and it is the place where one expects to see serious and consistent thinking about how the presenting problem is to be resolved by collecting and processing primary data in order to generate the expected project outcome that will eventually lead to a real-world benefit called the project target. There are three elements as follows. (See Workbook 3 section 3.2, 3.3, 3.4 and either 3.5.1 or 3.5.2 as appropriate)</p> <p>1. Research Method Selection – this is an overarching framework used to guide and control the research effort. There are many Research Methods and it is necessary by a process of logic based on ones Research Question and it primary data needs to select and justify a suitable method. For Engineering projects the research method is focused on collecting application requirements. (See workbook 7)</p> <p>2. Design of Primary Data Collection Plan – based on the Basic Activity for Generating Data which focuses on the core data needed and then that basic activity surrounded by a process that allow reliable collection of the primary data. (See Workbook 3 section 3.5.2). For Engineering projects the plan is based on the outline application proposal which focuses on the core requirements and outlines a process or processes that allow reliable collection of the requirements. (See Workbook 3 section 3.5.1)</p> <p>3. Design Primary Data Processing Plan – with a collection of primary data in some suitable form one can apply some processing to it in order to arrive at the expected project outcome. Typically this might be statistics if the data is quantitative, various forms of text analysis or diagramming if it is qualitative. (See Workbook 3 section 3.5.1 or 3.5.2)</p> <p>For example, if one conducted a survey on the effects of SPAM on personal productivity then this might have been done with a questionnaire with say 20 questions. Now processing each question and drawing charts and graphs is NOT the same as explaining the effects of SPAM on productivity – to do that one must consider the whole survey where each question would be a dimension of the problem space. It follows that typically one pre-processes the data collection in some way and later using the results of that pre-processing we further process the data to get the intended outcome</p>
Table 4. Specification Elements Work Plan	

2.6 Critical Reflection

Students must expect to go back and forth over their work because as knowledge and understanding grows one will inevitably see that some of one's earlier work was incorrect or not as clear as it could be or maybe it can be improved in some way. This revision strategy is very important as a common fault with research work is that it often lacks consistency because there was no serious reflection on earlier work.

2.7 Chat Session Profiles

The following is a simple guide as to what students will be covering in the online chat sessions. These sessions are extremely important as they are usually interactive and are based on using examples. The research Methods Unit will involve a chat session roughly once every week – half these sessions will be based around the notion of research methods and half based on statistical processes.

2.7.1 Chat Session 1 – Setting up a Project?

This chat session will be a discussion of what is meant by research. The chat will focus on the idea of a presenting problem, target and outcome as the basic project building blocks. From this the chat will move to discuss a framework to surround a research project and a look at some of the core techniques that must be mastered. To prepare for this chat read Workbook 1 and 2 and Workbook 6 section 6.2 to 6.6.

2.7.2 Chat Session 2 – Refining a project Idea?

This chat will take the form of a discussion on how a project idea is explored and focused and a full example will be used followed by an open discussion and questions from students.

To prepare for this chat, students should be familiar with the title approval format shown in Assessment 1a and the specification examples and notes shown in Workbook 3 sections 3.5.1 and 3.5.2. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea. Of particular concern in this chat is the notion of presenting problem Workbook 6 section 6.2 and form of answer (project outcome) in Workbook 6 section 6.3 and 6.7, Basic Activity for Generating Data Workbook 6 sections 6.8 and 6.9. Students must work hard on these three ideas if they are to form an acceptable project specification.

2.7.3 Chat Session 3 – Research Method and Research Designs

In this session a research design will be developed based on a personally developed problem definition, research question, form of answer and Basic Activity for Generating Data. To prepare for this chat students should be familiar with the title approval format shown in assessment 1a and have studied the specification examples shown in Workbook 3 sections 3.5.1 and 3.5.2 as well as the associated notes in section 3.1. It would also be useful if students had some idea of the area in which they want to work so that they can map the various exploratory elements on to their own idea.

2.7.4 Chat Session 4 – Literature Reviewing and Working in a Scholarly Manner

In this session some examples of student work and how they write down their ideas will be examined based on scholarly principles. This will be followed by looking at a process that applies equally to what one writes and what one reads. The remainder of the chat will examine several excerpts from student work that exhibit common faults. To prepare for this chat read workbook 8 on citation styles and bibliography, chapter 4 of the notes and Workbook 5 and it might be useful to read through the sample short Literature Review in Workbook 4. In addition, it will be useful if one look at one's own way of using primary source materials and find some examples that are good and bad.

2.7.5 Chat Session 5 – Aim and Objectives

This chat will focus on how to write an aim and a set of objectives based around a problem definition and a Research Question. To prepare for this session read Workbook 6 sections 6.11 and Workbook 9 section 9.6.3 but also consider one's own project idea and what might be suitable in that case.

2.7.6 Chat Session 6 - Open

This chat will look back over the course and typically review faults that arose out of the assessment of the project specification. This will be supplemented by a discussion as to how various project elements: title, research question and Basic Activity for Generating Data, aim (not aims) and objectives are constructed but focused on the basic Activity for Generating Data.

2.7.7 Extra Chats - Open

Normally, each week there will be an open chat on Sunday at 1400-1500 where students may bring their questions, comments, concerns or grumbles. These are useful sessions but only when students come prepared with items that they need to discuss. These are not teaching sessions so the tutor will have nothing to say unless students come prepared with questions and are willing to participate.

3. WORKBOOK 3. PROJECT SPECIFICATION NOTES AND EXAMPLE

This section contains some guidance notes and sample completed project specifications - please consider them carefully. Do NOT copy them blindly – they are just for guidance and students must write their own in a way that matches what they want to do. The aim of the specification is to state a project plan as clearly as possible so one needs to be concise and precise.

3.1 Project Styles

In projects two styles are commonly found. There are some restrictions on these two forms depending on what programme you are on but the Tutor will advise on that issue. Briefly the two styles are as follows:

Engineering – here you design and build a software application, create a system design etc.

Study – here you design a research program to collect primary data in an attempt to find an answer to an interesting question. For example, one might investigate whether cascading styles sheets lead to simpler accessibility or you might evaluate the role of email management in business success.

3.2 Specification and Design

The following notes and samples for project specifications may help you prepare your own. However, it is important to think of it as being primarily a design for your project. The specification is essentially in three parts although it is not presented in exactly this sequence:

Preparation – this is not explicit in the specification but implies that you have thoroughly reviewed the literature at least to the depth of feeling confident that you know enough about the project topic to define and gather data. Implicitly, the University will look at your use of the literature and reference list to assesses how prepared you are for this work at this level and on this topic.

Background – this is about you setting the scene and defining a problem and then focusing on that problem with a Research Question, aim and a set of objectives.

Research Design – this is the culmination of the specification where you set down your detailed design for defining, collecting and processing primary data to get your stated form of outcome. It is very important to realise that this is a design and without a sound design things are likely to go very wrong.

In summary, one needs to think of the whole processes as starting with a problem definition and ending with a solution (your project outcome) and the element that connects these two things is your research design. It follows that unless you have a good design you will not be able to get from your problem to your outcome and that will mean your project fails.

3.3 Project Specification Headings and Formatting

All the following main headings and subheading must be used and students must not introduce others. As these guidance notes are read it is advisable to also look at the relevant examples in section 3.5 so that one can clearly understand what is being said.

3.3.1 Specification Header

Make sure all your details are entered correctly otherwise work may be misfiled or rejected because we cannot ascertain whose work it is.

3.3.2 Project Title Construction

Project titles must make clear sense in English and not be overlong. See Workbook 6 section 6.13.

3.3.3 Specification Intention

This element is to be a simple statement regarding whether there is an actual real world client for the outcome of this project or if it has some other purpose.

3.3.4 Project Task Description

The main function of this section is to explain what is going to be done using the suggested headings below and as shown in the sample. The headings are intended to be precise and if students ignore or change them or use them for any other purpose the work will be rejected. The actual selection of headings will depend on the type of project: Study or Engineering.

Engineering Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct an Engineering project task description and must expect to go over them many times before a concise and useful description is formulated. For Engineering projects please note that a functional description means that one says what the application will do for the users and not how it might be built or what architecture is involved.

Situation Overview – express here a concise and high level description of the existing or proposed application area.

Presenting Problem Definition – a concise definition of some real world problem related to data processing of some kind. This is an important step since unless one can clearly see what the problem is then any solution suggested may be deficient in some way. In most cases the problem definition in engineering projects is related to elements such as data availability, searching, access speed, storage, processing, accuracy, sharing, reporting, entry, updating, deletion, control, security, volumes, segregation, consistency, worker efficiency, process systematization, communication and so on. For the purposes of writing a specification the expectation is that students will focus their problem definition on one major aspect of the application scenario. See Workbook 6 section 6.2 and 6.6.

Real-World Target – a summary of the real world effects that are expected if this problem can be solved or partly solved.

Application Proposal – expressed as a concise description of the main system functionalities. When describing the main functionalities it should be done at a high level and it is recommended that they are all coherent and there should be no more than 10.

Ethical Overview – express here a concise review of any ethical impacts of gathering the primary data, processing it or system usage.

System Architecture – a concise description of the major or main architectural elements of the proposed application

Strategic Value – expressed as a concise argument that the application is able to deliver to the stated problem definition.

Study Projects Headings

Students are recommended to use these headings carefully in a step by step manner to construct a study project task description and must expect to go over them many times before a concise and useful description is formulated.

Project Topic Area Overview – a concise description of the topic area aspect being covered.

Situation Overview – a concise, high level description of the context in which the research is set.

Presenting Problem Definition – expressed as a concise statement of the single underlying problem leading to this study. This is an important step since unless one can clearly see and define what the problem is then any solution suggested may be deficient in some way. Study projects look at an aspect of strategic business IT and that might cover technology effectiveness, IT investment, user acceptability, development or improvement plans, feasibility studies, legacy systems and so on. See Workbook 6 section 6.2 and 6.6.

Real-World Target – what desirable real-world benefit is likely if the stated problem can be resolved or partially resolved. (See Workbook 6 section 6.3)

Research Question – expressed as a concise question that captures the problem definition and the real-world target. See Workbook 6 section 6.7 and 6.9.

Personal Theory – expressed as a concise and focused rationale regarding what an answer might be to the Research Question. See Workbook 6 section 6.5.

Intended Project Outcome – write a concise statement that expresses the expected major project outcome as it arises out of the stated problem definition and your personal theory and would be an answer to the Research Question. See Workbook 6 section 6.4, 6.7.4 and 6.9.

Strategic IT Value – here it is necessary to discuss ones intended project outcome and show that it is or leads to a Strategic Business IT impact that could eventually resolve the stated problem definition and hence generate a Strategic Business IT value. See example in Workbook 4.

Ethical Overview – a concise review of any ethical impacts of gathering the primary data, processing it, presentation or usage of results in the form stated

3.3.5 Overall Project Aim

This is a vital point in the specification because in a very concise manner a researcher brings together in one aim: the main project **activity** to get a stated project **outcome** as well as telling us what **data** is the focus of the activity and finally what the purpose or **target** for the project outcome is in relation to real-world problem resolution. It is essential that you fully understand these four elements as described in Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3.

3.3.6 Set of Project Objectives

To meet an overall aim it is necessary to achieve a number of milestones indicated by a set of objectives generating minor outcomes. Objectives can be hard to write and it is expected that there would be between 3 and 6 of them. See Workbook 6 section 6.11 and 6.10.2, Workbook 9 section 9.6.3.

3.3.7 Research Design

The Research Design is about the core elements that generates primary data and processes it into the form of answer expected (your project outcome). The Research Design is divided into two phases.

Design for Collecting Primary Data – a process or processes used to define and create a primary data collection. It has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the actual data and present that data.

Design for Processing Primary Data – a process or processes used to manipulate the collection of primary data to get the form of answer expected.

A useful analogy for a Research Design is that it is like deciding that you want a sponge cake and then working with a shopping list (a list of primary data that you want) to collect a bag of ingredients (collection of the listed primary data). Once we have our ingredients (primary data) we use a recipe to prepare and mix them (pre-processing the primary data) ready for the final processing step to bake the cake (like generating your form of answer). To reverse the analogy, if you were going to make a cake you would not walk into a shop and just pick up a random set of ingredients and then mix them all together into some muddle, bake it and expect a cake to emerge - no one but an idiot would do that would they?

The suggested headings to use are as follows and you are recommended to use them carefully in a step by step manner to construct a research design. You must expect to go over them many times before a concise and useful design is formulated. In the examples I have added the step numbers for clarity but you do not have to do that in your own work as long as all the elements are present.

Engineering Projects Research Design Format

Research Design Phase 1 – Requirements Collection Process

This phase is concerned with a process that generates a reliable collection of primary data which in an engineering project will be a set of requirements. See Workbook 7 section 7.10.

Define – here one bases the definition of requirements on the outline proposal document.

Location – state where or from whom the requirements can be found.

Collection Protocols – here it is necessary to select appropriate collection protocols such as: interview, observation, records searching and so on needed to collect the requirements under the standard four headings: Functional, Non-Functional/Performance, Technical and Usability. See Workbook 6 section 6.6.1.

Requirements Presentation – the requirements data once collected will typically be presented as interview transcripts, notes and copies of documents and lodged in the project document appendix as a kind of requirements catalogue.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulate it to get a design for the application. This is in two sections.

Overview – show how the various requirements are expressed in a design.

Specific – in any design there will be aspects that have no obvious means of expression and such aspects are typically written as a list.

Study Projects Research Design Format

Research Method – make a selection and write concise rationale for its use. See Workbook 7.

Research Design Phase 1 – Primary Data Collection process

This phase is only concerned with generating a reliable collection of primary data and is based on the Basic Activity for Generating Data but to be it has to be surrounded by a complete process.

Basic Activity for Generating Data – a concise description of the activity that forms the core of the primary data collection process. See Workbook 6 section 6.8 and 6.9

Primary Data – outline primary data items to be collected. See Workbook 6 section 6.6.

Location – a concise description of where the primary data may be found. In practice it may come from almost anywhere including extraction from existing secondary sources.

Collection Protocol – a concise description of the actual collection procedure which may be based on one or more of the following: interviews, questionnaires, observation, roles playing, document analysis and so on. See Workbook 6 section 6.6.1

Primary Data Presentation – expressed as a concise description of the way in which the primary data will be presented.

Research Design Phase 2 – Processing and Presentation

This phase is only concerned with a processing the collection of primary data in order to get the expected project outcome.

Design of Pre-Processing for Primary Data Collection – concise description of the processes applied to the raw primary data collection to generate a refined collection of primary data structured in a fashion that makes it suitable for generating the intended project outcome. (Workbook 6 section 6.6.3) (Please note that this step will not always be needed)

Design for Primary Data Presentation – presentation of data collection generated from the pre-process step - if that step is not needed just a presentation of the primary data.

Design for Generating the Intended project outcome – here the primary data collection (pre-processed if necessary) is used in some algorithmic or heuristic fashion to generate the intended project outcome.

3.3.8 Logistics and Tools

In this section the practicalities in terms of tools and time need to be considered. It is only necessary here to state things that are specific to this project, so it is not required to say things like: the library, Word, Excel, paper, pen, SPSS and so on as these are common and almost always available everywhere.

3.3.9 Outline Content List for your Project

This should be detailed enough to ensure that there is a clear idea of the final structure of the project document. Please be careful with the essential elements as indicated on the marking forms since if they are omitted a significant number of marks may be lost in the final project. See Workbook 9 table 6 and section 9.3.5 where typical chapter and section headings can be found. Workbook 11 or 12 (marking forms) need to be consulted so that no essential elements are omitted

3.3.10 References

This section is used to assess how well a student has prepared for the project activity. The University will want to see that the reading is current, comprehensive and focused on the topic area. It is expected that work in the specification will be supported from the literature particularly in the outline description and research method sections. Unless the literature is seen to be used in the various sections of a project specification it may not be approved although it is not expected that one cites from every book in a reference list. See Workbook 5 and Workbook 8 and make sure citations are in the Harvard APA style.

3.3.11 Project Plan

The plan must be developed by looking at ones contents list and considering what activities are necessary to generate the various project objects. Aim for around 12 to 20 activities lasting at least 18 weeks with any suitable start date. A project activity is something that is significant and requires planning and monitoring. So for example:

Prepare Metric Program – this is clearly a significant activity that has to be planned and monitored and so properly part of the plan

Select an Organization – this is an activity and might be important but it is doubtful if there really is a significant process involved here that has to be planned and monitored.

Outline Implementation Plan – this is not an activity so should not be in the plan.

The University will examine each plan and will want to see that it is focused on the project – the implication here is that it should be possible to see that a given plan supports a particular project idea not juts a copy of one of the samples or is so generic it might apply to any project.

3.4 Testing Your Research Design

A design must amount to a logical plan that takes a problem definition to a description to the expected outcome that will resolve the stated problem. The following are a useful check that a plan is sound.

Practicality – consider whether one has the resources to be able to carryout a plan. This is a very serious step and must not be taken lightly. It is all very well to have an elaborate plan on paper and to think because it all sounds logical that it can actually be done. In many cases a crucial test of practicality is to be sure that one can get the data from the locations specified.

Credibility – here one is expected to be honest and decide whether the plan will result in useful data and outcome. It is unfortunately true that many research projects end up being trivial because of poor identification of data and more importantly the choice of appropriate collection protocols. It is also worth considering the data processing functions as they must also be credible.

Confirmability – this test is about what would happened if the same research was done a second time with the same data – would the researcher end up with the same answer. To put it another way, is the processing method too dependant on an individual and that dependence may lead to bias.

Trustworthiness – here we are concerned that the conduct at all stages is such that one could have confidence that the results are genuine and not manufactured.

3.5 Example Specifications

Here are some sample specifications, they are complete except for the contents list and project plans but they are not meant to be copied without any conscious thought and any obvious attempt to do so will result in specification rejection.

3.5.1 Example Complete Engineering Project Specification

Here is an example engineering specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Engineering) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2,414)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – the customer is SIS and the application is expected to go live by June 12, 2006.

Project Title - An Assessment Marks Processing Application. (See Workbook 6 section 6.13).

Situation Overview

Currently, the core processing is done by staff members dealing with their own assessment marks, typically using Excel. The staff member then forwards his marks sheets, usually in paper form, to the administration office where the marks are collated using Excel to give an overall score for each student. These two marks sheets: individual unit marks and overall student marks are then presented to the Board of Examiners for scrutiny and acceptance. The process ends when a transcript is sent to each student detailing their results for that semester.

Presenting Problem Definition

The actors feel that the root problem is about consistency and accuracy given the sensitivity of the data but coupled with difficulties with storage, retrieval and reporting. (See Workbook 6 section 6.2 and 6.5)

Real-World Target – the desired effects here are that consistency and accuracy are both improved but at a reduced workload. (See Workbook 6 section 6.3)

Application Proposal

Based on the presenting problem there an application is needed that can offer us consistency and accuracy in the processing of assessment marks, both by unit and by overall student performance. The system to be called a mark processing system and it will have the following main functionalities.

Functional Requirements

1. Store name, address, year of study, name of course and unit details of all registered students.
2. Store the assessment patterns for each unit including weights and pass mark.
3. Allow for the entry, updating and deletion of any or all records.
4. Allow for the entry of assessment marks for individual entry or by batch updating via CSV
5. Report on marks for each unit including basic statistics.
6. Report of overall student performance, including basic statistics.
7. Produce student transcripts.
8. Provision for other ad hoc reports at a later date.
9. Secure access to individual results to be available to students through a portal.

Non-Functional and Performance Requirements

1. Store records for at least 6 years.
2. Allow for at least 6 simultaneous users
3. System must be capable of processing all the data and providing the reports within 10 working days. The estimated current volume is 145,000 data entries and 139 reports but this is expected to grow by about 7% per academic session.

Technical Requirements

1. Be developed in MS Access 2003.
2. For use under Windows XP.
3. All processing activities, including reporting, to be carried out using native Access facilities.
4. All processing is to be done using Access VB and no macros are to be used.

Usability

1. Be developed using normal windows formats and standard colours.
2. Fonts use in screen to be no smaller than 9 point and standardised at Ariel Narrow.
3. Assumed screen size to be 19".
4. Report to be printed as appropriate but with fonts never less than 10 point.
5. Data entry load per screen to be as recommended in DEF 981.90.
6. There should be some consideration of access via the portal for the visually impaired.

Ethical Overview

The collection of requirement here does not present any ethical problems. However, when in use the system contains personal and sensitive data and this aspect must be considered in the design

System Architecture

The intended application is essentially a database system with a web link. It will therefore have two interfaces: one a direct link to the database through the Access application and the other through a secure web interface routed through a portal but with only read access.

Strategic IT Value

The proposed application and its functionalities should address the presenting problem very well. In particular controlled data entry, data storage and reporting. This should reduce administration overheads and costs in a cost-effective manner.

Aim

To build an assessment marks processing system using standard MS products in order to ensure consistency and accuracy in the processing of student results. (See Workbook 6 section 6.11 and 6.11.1, Workbook 9 section 9.6.3)

Objectives (See Workbook 6 section 6.10 and 6.10.2 and Workbook 9 section 9.6.3)

1. To produce a detailed, departmentally based, marks processing requirements document.
2. To produce a detailed marks database design using standard documentation protocols.
3. To produce a detailed assessment functional design to include data entry, updating, deletion for marks processing and reporting.
4. To design the secure portal for student use.
5. To produce and evaluation report of the marks application.

Research Design Phase 1 – Requirements Collection Process

This part of the research design is concerned with constructing a reliable primary data collection for later processing into the form of answer expected. In this case the primary data collection is a set of detailed requirements for the marks processing application. The primary data that we need is related to the proposed major functionalities stated earlier and given to us in the form of a proposal. For each of the functionalities it is now necessary to decide. (See Workbook 7 section 7.10)

Location – The requirements can be found at various locations in Portsmouth. In particular

Detailed Functional Requirements: the appropriate targets for this exercise are: SIS office administrators, departmental course leaders, individual academic staff, Heads of Department and the University registry (for regulatory aspects). It may also be useful to make contact with a number of external examiners to ensure that the reporting arrangements are acceptable. In addition there will be various documents such as regulations and marks sheets

Non-Functional and Performance Requirements: the appropriate targets here are the Registry since they set examination and graduation dates as well as define the necessary reports. The office senior administrator also needs to be consulted for staffing and usage issue. During this process there must be detailed discussion with the department and the Registry over security issues as this is a major ethical issue. In addition there will be various documents such as regulations, external examiner reports.

Technical Requirements: the appropriate target here is the departmental technical to establish hardware and software profiles. It may also be necessary to discuss network and security issues with the University central computing department. It may be necessary to see network and PC specifications and various security profiles.

Usability Requirements: the basic design is based in Windows protocols so there are no particular requirements to be gathered. However, because it is possible to implement interfaces in a few ways particular usability requirements will be ascertained by use of a mock-up used with the administration staff. With regard to the Portal there will need to be discussion with the University webmaster over formats and protocols to be used. In addition there will be various documents defining standards and formats.

Collection Protocols – The collection is essential a survey format where each requirement aspect will be discovered by just three formats: (See Workbook 6 section 6.6.1)

Detailed Functional Requirements: expressed as interviews, document analysis (marks sheets and regulations) and some observations. It may also be necessary to use observation to examine any existing Portals.

Non-Functional and Performance Requirements: interviews, document analysis (marks sheets and regulations) and observations.

Technical Requirements: interviews and document analysis (system specifications and profiles)

Usability Requirements: interviews and document analysis (system specifications and profiles). In addition it will be necessary to run some focus groups to look at various interface design option by means of mock-ups.

Requirements Presentation – the requirements data once collected will be presented as interview transcripts, notes and copies of documents. These artefacts will be reviewed and a tabular format used to present the requirements and lodged in the project document appendix.

Research Design Phase 2 - Design Presentation

This part of the research design will take the whole collection of requirements and manipulates it to get a design for the application. This is in two sections.

Overview – here the vehicle used to present the various requirements in a design format will be UML. The mechanism will be to take the written requirements documents and map them to a suitable diagrams in the form of use cases, class diagrams and where appropriate collaboration or sequence diagrams.

Specific - where necessary a written list will be provided. These will mainly be used to state unambiguously the various non function, technical and usability details.

Logistics and Tools – Required Resources

All the hardware and software are available at the Client's premises and all work including requirement gathering will take place there. The major products needed are: Dream weaver and MS Access and scripting will be done using ASP.

Outline Content List for your Project

See project guidance notes for samples and they can be found in Workbook 9 section 9.3.5 and table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See Workbook 8)

Walker (2001), IT Problem Management, Prentice Hall, 0-13-030770-5

Bruton (1997), How To Manage The IT Helpdesk, Butterworth Heinemann, 0-7506-3811-7
etc

Project Plan

Any clear format may be use but a typical format (but not events) can be found at the end of the Study Project sample specification.

3.5.2 Example Complete Study Project Specification

Here is an example study specification. It is for guidance only and students must not try to copy it since it is unlikely to match their own project idea. However, the headings and sub-headings must be used in any submitted work.

If it is obvious that a student has just copied part or all of this specification the work will be rejected. Students MUST think through their own idea step by step and the University will be looking for evidence of serious thought and commitment.

Literature Review & Project Specification (Study) – Jan Smith 341387 MSc Computing

Detail - jan.smith@port.com for Cohort Started March 2006 (Word Count = 2653)

Literature Review - Include your short Literature Review here. (See sample in Workbook 4)

Project Specification (please start on a new page)

Intention – no customer involved and project results will be used to produce a research paper.

Project Title - Quality Control in Program Development - A Possible Strategy (Workbook 6 section 6.13).

Project Topic Area Overview

There is much interest in Software Quality assurance at present and this is for obvious reasons. Software applications are unlike normal products which wear out and can be tested over time to see where most wear takes place and hence calculate a mean time between failures. By this means failure can be effectively prevented by maintenance. However, in software such wear does not occur although an analogue of this is when other hardware and software components around the software, or the application itself changes and hence problems arise. Typically, we test program code and the more we test the code the more certain we become that it is robust.

Situation Overview

The research is set in The University of Portsmouth with the School of Information Systems. In that context it will focus on the programs produced by first year computing undergraduate students.

Presenting Problem Definition

The problem for developers is focused on knowing when code is robust and ready for release. (See Workbook 6 section 6.2 and 6.5).

Real-World Target

The benefit that would accrue in the real-world if this problem can be resolved or partially resolved is that developers can feel more confident about their product and therefore not risk costly development overruns and compensation claims from clients. (See Workbook 6 section 6.3)

Research Question

How can developers feel sure that software applications are ready for release in order to prevent costly overruns and client disappointment? (See Workbook 6 section 6.7 and 6.9)

Personal Theory

The topic is fraught with difficulty because there is no accepted way to measure program code to see how good it is or even to see if it is correct. Blithe (2002) explains that it is well understood that it is not normally possible to measure, using an interval and ratio scale, in any meaningful way the quality of program code. However, it might be possible to find some means of 'indicating' the quality of the code in the sense that one might be able to pick outliers by taking certain kinds of measurement. It is therefore suggested, that simple measurements of various code properties might be used to pinpoint outliers and hence shorten the testing cycle by transforming the measurement statistically into a pseudo Interval and Ratio scale form which is called Planar Similarity. (See Workbook 6 section 6.5).

Intended Project Outcome

It is expected that the form of the answer arising out of this theory will be a demonstration in the form of a report with graphical evidence that endorses the proposition that Planar Similarity is an appropriate software quality indicator in that outliers can be detected hence assuring the measurement process. (See Workbook 6 section 6.4 and 6.9)

Strategic IT Value

If Planar Similarity is indeed a useful measure of software quality it can be used routinely to examine software in production and give an early indication of quality and that will lead to shorter test cycles and hopefully more reliable software installations and a consequent reduction in cost. In fact Clitheroe (2003,p6) has suggested that detecting all code faults at the initial coding stage might save as much as 23% of development costs. (See example in Workbook 4)

Ethical Overview

There are no current users of the process being developed there would not seem to be any ethical consideration of importance. However, it is necessary to explain to the students supplying the sample programs the purpose of this study and assure them that none of this information will be used for assessment and allow them access to the results if they so wish.

Aim

To report on the efficacy of the Planar Similarity measure using simple metrics as a means of finding outliers in program code and hence reduce coding errors leading to development cost reduction and client approval. (See Workbook 6 section 6.11, 6.11.1 and Workbook 9 section 9.6.3)

Objectives (see Workbook 6 section 6.11 and 6.11.2)

1. To model the software construction process.
2. To report on appropriate simple and synthetic metrics that might be used as indicators of quality in application programming code.
3. To define a process that will extract the defined metrics for any piece of code.
4. To document a suitable statistical process for reducing the metric value set to just two dimensions.
5. To analyse and report on the data, including outliers, and hence derive some general conclusions regarding the utility of the Planar Similarity metric.

Research Design - Research Method

The chosen method will be case studies since I want to see the impact of the measurement process within a defined context and of particular interest in that context is student programmers with differing abilities in writing business application style programs. The case criteria are simple and amount to selecting a sample of students at a set point in their first year of study and a set of matched programming tasks. (See Workbook 7)

Research Design - Phase 1: Primary Data Collection Process

This part of the research design is solely concerned with constructing a reliable primary data collection for later processing into the form of answer expected.

Basic Activity for Generating Data

The basic idea is to compare a new piece of code with an existing piece that is known to be sound and take a series of measurement on each one that might highlight any differences and so indicate an outlier. The idea has some support based on early studies carried out by Sheene (1999) who noted that a reasonable means of indicating quality in program code is to compare similar pieces of code by calculating several metrics for each piece although he did not define how this might be done practically. (See Workbook 6 section 6.8, and 6.9)

Primary Data

This study will define 20 software metrics which will be calculated automatically and for each sample programme. The metrics that form the primary data collection for this research will be such things as: function density, function count, cyclomatic complexity, data associations, decision count, decision density, number of variables, number of function calls, etc. (see Workbook 6 section 6.6)

To set up the case studies three computer program specifications will be drafted with the students working in 'C++'. The specifications will be written so that the defined software application is, in each case, of a different style and progressively more difficult. An expert in 'C++' will produce a set of generics to match the requested programmes – it should be noted that a generic is an outline or skeleton of certain kinds or classes of program.

Location – The sample frame is all first year students on computing courses at Portsmouth University. This is around 350 students and my calculated sample size is 200 students, however, since the data collection process is automatic all 350 students will be used in this study.

Collection Protocols – The collection is essentially a survey format where the students will be given the relevant generics and the specifications and asked to write three computer programs of increasing complexity, one in each of three semesters. In this case there is a large data set to be collected and it is not practical to do the collection by hand. In view of this an application will be written that will process each student program so that metrics may be calculated automatically and stored in a suitable electronic file. Students will be requested to deposit their programs on set dates into an online drop box for both marking (not part of this study) and metric calculation. (See Workbook 6 section 6.6.1)

Primary Data Collection Presentation

The sets of primary data will be available in the project document appendix and will be presented in tables where the rows represent the sample programs (one row for each sample) and the 20 columns the metric values.

Research Design - Phase 2: Processing and Presentation

This part of the research plan will take the whole collection of primary data and manipulates it to get the expected outcome form, which was a demonstration that outliers can be detected hence assuring the measurement process. The processing is in three steps: manipulate the raw primary data, presented the processed data in graphical form and extract from the graphs features by manual inspection.

Design of Pre-Processing for Primary Data Collection (Workbook 6 section 6.6.3)

The metric data sets will be read directly from the files produced in phase 1 and then statistically processed to define a similarity measure for each program using principal component analysis and multidimensional scaling. The outcome of this processing will be pairs of values, one pair for each sample program, suitable for plotting in two dimensions.

Design for Results Presentation

The pair of values from the first processing round will be plotted in two dimensions, together with the results for the generics producing three graphs one for each program specification.

Design for Generating the Intended Project Outcome

Once the graphs are available it is then a simple matter to look for outliers in particular and attempt to explain their distance and orientation from the generic and other programs in the class. The contention is that similar programs will cluster together and ones that are different (even though the specification was the same) will show up as outliers and can be identified and examined to see why that difference occurred. It is hoped that the results will be similar for all three program in that data set and hence demonstrate that complexity is independent from planar similarity.

The final step is to use the identified outliers to go back to the actual program code to explain why the code produced the outlier. In this way it will be possible to get an indication of why a given program is deficient. This final processing step allows me to generate my report on Planar Similarity that contains my overall findings and evidence on its utility.

Logistics and Tools – Resources Required

All the hardware and software are available at the University. Since the data collection process is automatic the use of staff resources is minimal.

Outline Content List for your Project

See project guidance notes in Workbook 9 section 9.3.5 table 6 but you must also be aware of the marking forms that can be found as Workbooks 11 or 12.

References (See workbook 8)

JKM Quality Assurance Handbook (Company Confidential)

Garlick, F. J., (1993), Planar Similarity - A New Synthetic Metric, SQM, Elsevier, 1-85312-225-4

etc

Project Plan - Master Schedule expressed in weeks (You may assume that a project take about 18 weeks to complete)														
Dates are Mondays	March				April				May				etc	
Event	6	13	20	27	3	10	17	24	1	8	15	22	29	etc
Literature Search														
Identify metrics														
Write Metric program														
Etc.														

4. WORKBOOK 4 – LITERATURE REVIEW & STRATEGIC IT VALUE NOTES/EXAMPLES

This is a sample of what is expected in assessment 1a, however, it only shows two elements: the strategic business IT statement and the short Literature Review. Try to keep in mind that this is just ONE example and do not try to copy it blindly or try to fit it into what you want to do.

Strategic IT Value

This work was based on trying to resolve or partly resolve the problem of low quality code leading to the need for costly re-work at later stages in the development cycle. The importance strategically of this work is that the outcome: a definition of new software metric will imply that it is possible to identify poor application code and this can be done at an early stage in the software development life cycle. The importance of this is that corrective action can be taken early in the development cycle and as a consequence costly re-work late in the cycle can be avoided or reduced. A secondary or added value element is that the results will allow the identification of good programming standards and this in itself will also lead to improvement and strategic advantage on all products delivered.

Tutor Comment

The key element here is that one relates the expected outcome or form of answer to its use in resolving the problem theme that was the basis of the project, and hence demonstrate a strategic business IT value. Failure to create a clear argument based on the problem theme and outcome leading to a strategic business IT value will mean loss of marks.

Literature Review (See Workbook 5 but note section 5.6 in particular)

Hiskett in his 1987 seminal paper on metrics defined several apparently useful metrics, the best known of which are 'program vocabulary' and 'program length' which are essentially metrics that count operators and operands and their usage in a given piece of code. Hiskett's metrics are easy to calculate but he was unable to show any strong correlation between his measures and program quality as defined by experts in the field. Similarly, Rogers and Hamerstein tried to use Hiskett's metrics as predictors of MTBF in accounting software but the results were inconclusive and no link could be found between the metrics and the type of software (functionality), accounting in this case, and the metric used.

Garlick, Sheene and Southwood (1999, p450) attempted a new approach that involved the notion of similarity, which they called planar similarity – that is two programs could be defined as similar because: they are written in the same language or they perform similar functions or they were written to the same standards or they are written to the same specification or they were written by the same team or finally they perform the same function. Their work is aptly summed up in the opening paragraph of their paper:

"The nature of any true measurement is easy repeatability and this implies that the style of measurements form a suitable metric space. This means that we need to define the nature of the similarity before we define a measure. In principle this is simple since it is easy to name the similarities but in practice it has been difficult to articulate a precise definition."

The similarities described above deserve further explanation but here only two of them in combination are used: similar language and similar or same specification. Similar language is easy to understand but at first glance it would seem that if two different programs are written to the same specification they are bound to be the same. However, after a little thought, it is obvious that if two different people write two different programs to the same specification the programs are certain to be different in many respects. It follows that the basic, though loose, hypothesis is that if planar similarity can detect a similarity (alternatively difference) in these programs - written to the same specification but by different people - it might be possible to use planar similarity to detect differences between two or more programs against any defined mode of similarity. Conversely, if it cannot be shown that a similarity exists between two or more programs written to the same specification then there is no hope whatever of showing any other kind of similarity with this metric.

Two final points need to be considered: what exactly is meant by software quality and why would a similarity measure be a good indicator of quality? To answer the first question we have only to refer to Kitchenham's 1998 paper where she defined five kinds of quality, briefly:

Transcendent View – quality is a kind of innate excellence, something felt rather than seen.

Product Based View - quality is related to the content/attributes of the product.

User View – quality is seen as equivalent to fitness for purpose.

Manufacturing Based View - quality is equated with conformance to specifications.

Value Based View - provide product at an acceptable price and conformance to a specification.

In this study the transcendent view was the one chosen as the basis of the definition of quality. The meaning of this view is defined by experts in the field – that is, can an expert in, say, Java programming make a judgement as to whether a given piece of code is good or bad – well, here it is argued that such an expert can and does such tasks routinely. Curiously there is very little literature on this idea of expert opinion within the software community but Gavin as early as 1978 touched on the subject. However, it is a reasonable conjecture and it will be used in this study – interestingly, if it can be shown that planar similarity can detect similarity (or equivalently differences) then it would also support the conjecture that experts can judge software quality.

Finally, the study will rely on the ability of experts to judge quality in software. This judgement is exemplified in the production of exemplar or generic programs. Garlick (2003, p98) has written extensively on this subject and the work is well known and will not be fully reviewed here. However, it is possible to define classes of program modules - validation, input, calculation, reporting and so on – it follows, that using the idea of similarity it is useful to create a standard or *generic* program or module for each class. Such a program can then act as a base line for all planar distances related to its application class and hence be a measure of similarity (or difference).

Using Garlick's idea we can let experts define our generic and then use that to compare with other programs – if we declare a difference then in simple terms we need to look at that program because it might be of poor quality and conversely if we declare no difference then we can fairly conclude that the program is sound.

Tutor Comment

The literature review is supposed to be a student's own work. As such it is a discourse that outlines the major areas of a topic area but amounts to an essay which is the student's alone. In practice this means that students must read deeply into the subject and then weave what is read into what the student already knows or believes in order to create a useful summary of the topic that will form a strong base for carrying out the actual primary data research - this implies that you 'master' the subject area and become expert in it.

It follows from the above that if all you do is copy or paraphrase from various sources without any significant comment or analysis on your part then it amounts to plagiarism and is worthless.

One final point is that when you write up your review in your final project document you should use various sub-headings and other formatting elements to structure the section to make it readable and meaningful.

5. WORKBOOK 5. LITERATURE REVIEW

The main function of this review is to ensure that one's mind is prepared with all the specific problem area knowledge that it needs to carry out the project and its primary research. In practice this implies the rather difficult task of integrating different ideas, theories and experiences into a thematic, informative, complete and clear discourse on your chosen subject area.

Preparation of the mind is done through adding your critical evaluative comment on what you find in the available literature and such critical reviews are typically hard work and not about downloading a few articles from the internet. The key characteristic of the greatest thinkers in history was absolute and unswerving honesty in all their thinking and that principle has never changed. They used their intellect and reasoning abilities to the full. They were honest no matter what the subject be it religious, political, business or academic. These men would not accept dogma from religion, politics or academic sources without subjecting it to serious critical questioning and of course this often meant great suffering for them.

5.1 Plagiarism

The KEY is honesty – without that your work is worthless – you may be able to fool some people but as Shakespeare said “This above all: to thine own self be true, and it must follow, as the night the day, Thou canst not then be false to any man. So when you plagiarize I may not know, the University may not know but YOU will always know that you obtained something falsely.

Plagiarism means passing off other people's ideas as your own. In academic life, it is one of the worst things that anyone can be accused of, as it is a form of stealing or cheating. It is fully expected that students will carry out research prior to completing a piece of work. This may include the use of books, journal articles, reports, manuals, notes and so on as source material. The material may be public, restricted to a closed set of people or with a security classification), or privately communicated. The principles are the same whether the material is on paper or in an electronic format. When you refer to an idea in a piece of your own work, it falls into one of several categories:

Common knowledge - many people know it and the information does not belong to anyone person but it cannot normally be deduced by you it has to be learned. It is probably talked about in several sources: the world is round, computers contain both processors and memory, OO is routinely used in software construction and so on. If you are sure that it is common knowledge, you do not need to cite a source. Be careful, authors will often write down in their own work things that are common knowledge so quoting them in that instance amounts to saying that a bit of what is common knowledge actually belongs to that author and that of course is an absurdity.

Obvious – many people know it and the information does not belong to anyone person but it can be deduced. It is probably talked about in several sources: companies tend to grow as time goes on, when the sun goes down it gets dark and so on. If you are sure that it is obvious you do not need to cite a source. Be careful, authors will often write down the obvious in their own work so quoting them in that instance amounts to saying that what is obvious to every one actually belongs to that author and that of course is an absurdity.

Published – this refers to an idea that found in a specific source or sources which is not common knowledge nor obvious but is nevertheless useful – in these cases you must always cite the source or sources of such an idea.

Original – you may include freely original ideas of your own. However, be aware that if the reader sees an idea that is not cited and is not common knowledge nor obvious, then they are entitled to believe that either it is a new idea published by you or you have plagiarised it.

5.1.1 Identifying Plagiarism

Plagiarism does not occur only when you copy words verbatim. Plagiarism is about ideas, and even if you express the idea in your own words, you may still be guilty of it if you do not credit the source. However, expressing an idea in your own words might often be good scholarship. The difficulty is that anyone can copy and paste a phrase, sentence or paragraph and cite its source. This is technically not plagiarism, but it's often very poor scholarship since it is obvious that such an activity tells us nothing about the learning, if any that has occurred

Scholarship is about showing your understanding and criticism of ideas. Simply copying, paraphrasing or summarising can only show understanding only to a limited extent. You need to "add value", that is make your own contribution to knowledge, to what you've read and you can usually only do this by expressing an published ideas in your own words and mingling them with your own thoughts and ideas.

5.1.2 Common Critical Devices

The essence then is to infuse your work with your own thoughts and ideas and let these mingle with what it is you have found in the literature. The most common forms of this are:

Interpretation - explaining and expanding on what you have found.

Criticism – discussing in order to judge whether the ideas are good or bad.

Decomposition or Analysis – to tease out the constituent parts of an idea.

Synthesis – by means of discussion and explanation link separate ideas together.

Selectivity - showing which ideas to include and which to discard.

Abstraction - taking an overview or defining a model or framework, usually by looking at examples.

5.1.3 Common Literature Tools

The following are the most common means of incorporating, in a scholarly fashion, the work of others into your own written work (a fuller discussion of these tools may be found in the notes).

Copy – use the exact words using quotation marks. A good rule is that each quote holds a single main idea, which you want to use and then you must introduce it and then follow it up with discussion.

Paraphrase – expressing something that you have found in the literature in your own words - the intention being to simplify, explain, or interpret a complicated idea. But take care there is a very fine line between simplifying, explaining and translating something and just being lazy.

Summarise – producing a précis or abridgment of a part of the source we have found. Essentially one is trying to capture the main points in an argument.

Analyse – the purpose here is to offer a detailed examination of some whole by scrutiny of its parts.

Synthesise – here the idea is to take parts and put them together into a new whole for some purpose.

You might find it useful to remember: copy in order to discuss, paraphrase to simplify, explain or interpret, summarise to capture the main points, analyse to understand and synthesise to build something new.

5.1.4 University Review Assessment

When the University looks at your Literature Review it will be trying to decide if you are committed and prepared for the topic and working at Master's level. If your work is poor in terms of structure, content and form you will find yourself failing. This is NOT necessary so long as you put in the work and ensure you understand how to use citations and the literature. I want to encourage you to do good work - it will ensure that you pass well and it makes your work a pleasure for the Examiners to read.

5.2 Review Content

The review is about your topic area and about you becoming sufficiently expert in it to deal with the problem that you will have uncovered. The intention is for you to offer a discourse that is focused, relevant, authored, measured, evaluative and expressed as a dialogue. (Notice the acronym FRAMED)

Focused – this means that your whole effort is focused on the topic area and the particular aspect of it that you are pursuing. So do not be tempted to add in other things just because they might be useful, interesting, and novel or you just have nothing else to say.

Relevant – any topic area aspect will itself normally represent a large body of knowledge and so one needs to continually ask if a particular element in the knowledge domain is relevant to your particular study.

Authored - any literature review is to be written by its author. This sounds obvious but it is all too easy to fill up a review with cited quotations, paraphrases, summaries and so on so that the 'hand' of the review author is not evident anywhere in the work. When this happens it is not an evaluative review at all but simple plagiarism. The author's 'hand' must guide and direct the review in an evaluative fashion so that the review is a message from the review author and not a recitation of what has been found elsewhere.

Typically this is done by using ones own skills and knowledge to introduce, comment, add to, modify and extrapolate from various primary sources available.

Measured – this is a matter of selecting and using the focused and relevant materials that you have found. Unfortunately, It is all too easy to pack in information in excruciatingly precise detail and so end up with a laboured entry that treats your readers as if they where completely ignorant of the subject area. So here one needs to just say honestly “is the entry a measured response to my and my readers, information needs”.

Evaluatory – authors sifts through the primary sources looking for materials to use. The essence of this sifting is an evaluatory outlook based on an awareness of your problem theme and your topic area. Care is needed because this process is not about searching for materials that you agree with or like in some way. Instead it is a contextualised response (what do you already know) and that may mean you find materials that are new to you, materials that make you change your own knowledge base and often materials that completely replaces what you thought was solid.

Dialogue – a review is a form of argument because good ones are based on a strong theme and in them one is trying to explain to, and convince your readers about something and so it is best if you think of it as a kind of dialogue in which you vicariously challenge them about your review theme and content.

5.3 What goes into a Literature Review

It will depend to a large extent what it is you are working on and what you want to say but the following list give some common ideas of content.

Challenge – this is two way: what you read challenges you and you challenge what you read for validity and applicability and so one might find new ideas or change our perspective.

Consolidation – reading widely consolidates your own knowledge base in that it can confirm or show any gaps in your knowledge.

Exploration - implies searching for new ideas, theories, concepts, rules and so on.

Self Check - affirm what we know for currency and accuracy

Support - the reading might support or be in opposition of ones views

5.4 Integrity and Evidence

This heading sums up research - integrity because it must be your own work and evidence because you MUST be able to show that your results have value. There are basically 4 strands to good work as follows

Dogma – this simply means things you have to take at face value. Most often they are things that are not open to reason in the sense that one is not allowed to question them and in some countries you can find yourself in serious trouble if you do. The problem with dogma is that by definition there is no logical support for it. Just to use a simple example, some faiths require you to have a beard or not eat pork as a matter of dogma – in such cases we usually cannot logically deduce that this is a right or wrong thing. It may of course be simpler than that since we all invent our own dogmas from time to time – for example it may be very simple such as ‘I will never buy a Ford car’.

We all accept dogma but that really is not the issue – the issue is that we should not accept it without some critical thought. There is at least one rational way of exercising critical thought on dogmatic issues and that is asking is the outcome of actions based on it good, bad, neutral or at least does not harm anyone. The trouble however, is that dogma sticks to us like super-glue and we will often go to great lengths to defend it and almost always this is done by sophistry (worthless arguments) and of course the notion of what is good or bad is not easy to define.

Reason – this is the ability to be logical and reason about what it is you are reading or writing. That is you are encouraged to ask questions and seek for a deeper understanding. This may imply that you accept new information, modify what you already know or reject something as no longer valuable.

Honesty – here we are talking about not taking things at face value and being honest with yourself about what you are reading or writing and asking does it all make sense and is it coherent with what I already know.

Motive – this aspect is about your reasons for wanting to read or write something. Now such motives can be high minded or they may be base. One must therefore always guard against tendentiousness (the author simply wants to convince a reader of something and may use any means to do it) in ones own writing and be watchful for it in the writing of other.

5.5 Literature Sources

The available literature is classified broadly speaking into the two kinds described below and ideally we only want to use primary sources.

Primary Sources – that is the first published documents. One can be really pedantic and say the real primary sources are the author's manuscript or autograph but these days we are satisfied with published sources. It will however, often be difficult to establish that something is indeed a primary source.

Secondary Sources – in almost every document you see, there will be elements attributed to other authors – these are then secondary sources.

Be careful not to confuse the above definition with those for primary and secondary data. When we talk of primary sources we are obviously referring to something that is published and exists whereas with primary data it will not exist until a researchers defined, locates and collects it.

5.6 Basic Writing Rules

For Study projects a full literature review will be needed but for Engineering projects the requirements document forms part of the Literature Review. However, even in Engineering it is necessary to write a short review just to form a technical backdrop to your project. It may help you to remember there are two cardinal rules when writing – they are simple:

Respect – always have a deep respect for ones readers and make it easy for them to understand what you are saying.

Need - only quote, paraphrase or summarize when it is clearly adds to what one is saying. The key task is to formulate ones own ideas, in your own words but one does this by building on knowledge of, and an evaluation of other people's ideas, not just repeating them.

5.7 Literature Assessment

When assessing this element the University will look at how YOU use the sources in what you write and at the range of sources that you used. If either is judged deficient your work may not be accepted as the view taken will be that you are not prepared for work at this level and on this topic. It is expected that all your sources will be mostly primary ones. If there is some reason why this is not possible it must be discussed with the Research Methods tutor or your project supervisor.

5.7.1 Literature Review Structure

All the following steps are iterative and you must expect to go backwards and forwards many times before you get a review with which you are happy.

List – Make a list of all the various topic strands that you need to know about. It may help you to think about strands such as: organisational, administrative, functional, social, technological, cultural, ethical and so on or some other structure best suited to you topic. Remember, this is not about writing down everything you know it's about giving your readers a focused discourse on your chosen topic area

Arrange – Use your prepared list above and put the topics into a logical and progressive order.

Theme – Decide on a theme that will link all the various topic strands together.

Structure and Content – Now use your themed list of topics and structure what you write using headings, subheading, paragraphs, bullets, tables, diagrams and so on.

Reading/Writing with the Intellect - This is normally thought of as a four stage process that applies equally to what is written (because it is going to be read by someone).

Understanding – this is simply taken to mean that we understand the words used.

Interpretation – are able to find meaning in the words used.

Evaluation – we ask does the meaning have any value – in essence we ask is it true or false.

Contextualization – this implies that everything we read is coloured by what we already know. This idea is taken much further in the idea of hermeneutics (see the notes).

Usage – the literature that you find and evaluate can be used to supplement your own work and demonstrate your mastery of the topic area. This does not mean that you quote, paraphrase or summarise everything you see. As a rule of thumb: only quote, paraphrase or summarise when it is necessary and it is not common knowledge and it is not an obvious observation.

Argument - Finally, keep in mind that when writing you are dealing with a form or argument where you are trying to persuade your reader about some point or other and that should only be attempted when you are knowledgeable, the argument is essential and you have a deep respect for your readers.

5.7.2 Literature Review Construction

Here is a plan that you can use to construct your own review. It is not infallible and will require conscious effort from you and it must be based on a thorough evaluation of the literature.

Step 1. Purpose - the purpose is to fully prepare your mind with all that you need to know about the topic area and the particular element of it that you are focusing on. The idea is that what you write shows your mastery of the topic and in fact you have become an authority on the topic area. So a review is not a long list of quotes, paraphrases and summaries, it is an evaluatory discourse. That is, readers will want to know what YOU have to say based around what you have uncovered in the literature - so readers must see what you have found and see what you have to say about it.

Step 2. Topic and Aspect - Make sure you are clear about your topic area and which particular aspect of it you need to explore and understand in order to be able to effectively carry out your planned research.

Step 3. Select a Theme - Use your project problem definition, target and outcome to guide you in selecting a theme that will connect all the various elements of your review together making it a lucid and progressive discourse. (Don't be afraid to alter the theme as you go along if that becomes necessary)

Step 4. Your own Views - Try to make a list of your own views, ideas and knowledge. Remember, the review is an evaluation of what you find not a recitation of it. If all you do is tell us what you have found you may not even pass because almost anyone can write a review on any subject if all that is required is to more or less recite what has been found. So you must structure the review around your theme and your own ideas and thoughts.

Step 5. Make a Review Content list - Based around your theme make an outline list of things to include and then arrange the list into an order that will take you progressively through the topic area aspects. Commonly it is found that it is useful to start as follows.

5a. Basic definitions and terms that need to be clear for the core topic area. (Be careful to note any abbreviations)

5b. Map out several important areas or problem space dimensions. Now it is impossible to be general here so for example if I were looking at mobile devices and their use in business I might map out the following elements: value, attitude, use, limitations, practice cost, ease of use, learning curve, effectiveness and so on. Please be careful here to look for significant things not just drag in anything and everything. Once you have made this list you may add to it, modify it or discard from it as you go along.

5c. Work out how you want to end the review - often this just sums up your point of view but you may have other ideas

5d. You may like to include some statistics if that is relevant. But don't let this run away with you and so the review just becomes some sort of justification based on statistics. Remember, statistics almost never tell us anything about the topic itself and only tell us things related to the relative importance of certain things we have identified.

Step 6. Literature Searching - Armed with your theme and list of elements now start your search for suitable material but be very careful to record the exact details of where everything may be found and checked. The search may start with the Internet or a special tool like Google Scholar but must move on to respected publications.

Step 7. Structure - The step is to structure what you have found and what you want to say about it so we get a coherent and lucid discourse on your chosen subject area. This is not a trivial matter and you must expect to go over it many, many times before it is really an example of your very best work.

5.7.3 Literature Review Traps and Pitfalls

Most of the things listed below are regarded as due to simple laziness and so are unforgivable in a Master's student or indeed any research student and if you are guilty of them then expect severe punishment in terms of loss of marks or failure overall.

Not a justification - A literature review is NOT a justification for your research idea or problem definition. So filling the review up with various statistics will never be regarded as explaining to the reader the topic area and your evaluation of it.

Statistics - Filing up the review with statistics carries no real value in convincing the markers that you are master of that topic area.

Poor Structure - where the review is little more than a few drafts notes obviously written without much thought. To communicate you must impose some structure on what you write else the readers will not be able to see any progression in your thought or in the topic.

Filling up the review with citations - one after the other with no student input. It is correct and desirable to tell your readers what you have uncovered but unless you make comments and add your own views on what is found the work will be regarded as worthless.

Common knowledge and Obvious - Quoting or paraphrasing material that is either obvious or common knowledge implies that you have not looked at the sources beyond the first page or forward. Here is an example from a project document. "Poston (2000) stated that organisation expected ERP systems to deliver improved performance". This is worthless as it is obvious that they would want this and to say it makes no valuable point at all - its no good trying to say things like this as if Poston was enunciating some law of the Universe or a point of huge importance on some new and valuable angle related to ERP - no he is just stating the obvious.

Bad citations style - It is very common unfortunately to see the citation form (Briggs, 2000) placed at the end of a sentence or paragraph. When we see this it can ONLY mean that all you have done is paraphrased, summarised or copied that section. This practice is more or less plagiarism and is representative of a very lazy attitude that assumes that just expressing something in your own words is a valuable contribution - its is not because YOU are saying nothing and what you are supplying is not really your own work at all.

Activity Definition - Some students use the Literature Review to tell us what they are going to do in the research. This will result in a zero mark as what is to be done is covered in the Research Design so repeating it here is valueless. This practice is a certain sign of laziness.

5.7.4 Reference and Bibliography

References are to primary sources that you use in the text of your written work. A bibliography is a list of sources you have identified as useful, including references, but not necessarily used. The University will look very carefully at any references to see if you are prepared for study at Master's level in your chosen topic area. Overall, the expectation is that you will list at least 10 sources. For each source you must consider its:

Currency – looks at publication date and be aware of changes in technology.

Completeness – Make sure you are looking at the final version not some draft or abstract.

Uniqueness – is the source a primary one

Coverage – Use your list of sub-topics to ensure that you cover all the areas required so that you are fully prepared. But make sure that you are not including multiple texts with essentially the same content.

Range – Make sure you have a good range of authors.

Authority – ask is the text authoritative. This can be done by considering the author, publisher, writing style and currency. It is also possible to use citation indexes to see how often the source has been used.

Accuracy – Is the information correct? If you cannot be sure then you must not use it.

Relevance – Make sure that your sources are relevant to your project topic.

Usage - The basic usage strategy is:

Find – Relevant texts using a library index, the internet, online book stores and so on.

Evaluate – Once you find a possible source you must evaluate it for content and relevance.

Contextualise – that is fit this new source into your personal knowledge base.

Cite – If you use a source it must be listed in your reference section and cited in the text correctly.

Discuss – You may include something from a source in your work as a copy (quote), paraphrase or summary but in all cases you must introduce it, comment on it at cite its source.

5.7.5 Evaluating Internet Resources

When using internet resources it pays to be careful and always sceptical because of the following factors:

Anarchy - anyone can publish just about anything on the Internet

Validation - authors do not always have their materials checked by an authoritative third party

Tendentious – when the author wants to convince you of something and will use any means to do it.

Honesty - authors may not always be what they seem and may assume personas, lie or make false claims

Consider – the motives of those who publishing on the Internet

Trust - in research trust nothing until you have good cause to do so. This is the opposite of what we do in our daily lives in that we tend to trust until we have reason not to

Context – be aware of the context of what you find. For example is it a University site, is it a manufacturer and so on.

Accuracy – this simply mean is the information correct. You need to be aware that information might be validly collected but still be quite inaccurate.

Validity – this simply means that we ask is this a valid source in the sense that it was constructed in a reliable manner. Any lack of information on proof readers, editors and publishers means that mistakes are more prevalent than in print and therefore increased scope for innocent error and for outright deception.

Authority – this means was the author competent to create this material. For example any one could have an interest in say Emotional Intelligence and quite easily create an internet article on that subject but it would not have the same authority as that of a University professor who has spent years researching the topic.

Uniqueness – here we are asking is this an original work (a primary source)

Completeness – this may simply be described as asking if the work is the final and finished version. You need to be very careful here else you might find your self using the material from the earlier part of the work which in fact is augmented later in the work.

Coverage – this means what is the scope and scale of the source. Now this does not mean that a source will cover everything on a given topic but it should be clear as to what it is covering.

5.8 Citation Examples

The following set of examples is intended to show some poor use of citations and also some sound ones. These examples should be studied with care by students so that they may avoid inadvertently fall into the trap of using poor scholarly practices. The quotes are from a range of sources and topics and in your study of them you need to concentrate on the form. Now assume all the following were all written by the Research Methods tutor so the comments will be offered in the first person and he is talking to you

These are just simple examples and they do not imply you must use italic or indenting as that is only used here to show clearly the pieces of work being looked at.

Example 1.

Lyau & Pucel (1995) found a link between training and productivity for their sample of Taiwanese car part manufacturers. Bartel (1994) found that training is a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors. Bishop (1994) and Barron, Black & Lowenstein (1989) both found that training increases management estimates of productivity.

This is poor because I only told you what the cited authors said. I did not introduce the author's words, nor discuss them and it's almost impossible for you to see what point I am making other than the obvious one that productivity and training may be linked – in effect it is not my work at all and there certainly is no sense of evaluation here. We might have written

Many authors (Lyau & Pucel 1995, Bartel, 1994, Barron, Black and Lowenstein 1989) found a link between training and productivity and that training is often a preferred and effective strategy for firms to address differences in productivity between themselves and their competitors ... followed by your comments/discussion/analysis etc

Example 2

It has been found that because Arabic words were written by copyists who did not use vowels that over time the meaning of some words has been lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. One way to deal with this is to use assonance and in this paper that approach will be taken (Noldeke 2003, p45).

The problem is that it looks as if I attributed the entire paragraph to Noldeke. So you can have no idea which part of the paragraph was my own thought or maybe none of it was. This is bad practice and some tutors even regard it as blatant plagiarism. The fact is that tutors when they see this form in will automatically assume that all the student has done is paraphrase what he has found and none of it in effect is representative of any student thought and will mark the work down because of it. It could have been written as follows:

There has been a long standing problems with some early Arabic manuscripts in that many words have become obscure and even in context they are still unclear. Bigly and Ahmed (1978, p340) and others have shown conclusively that because Arabic words were often written by copyists who did not use vowel, over time the meaning of some words became lost. Occasionally we also find that diacritical marks varied between different manuscripts and this compounded the problem of understanding some words. It has been usefully suggested by Noldeke (2003,p87) that one way to deal with this is to use "assonance analysis" to study word endings and in this paper that approach will be taken and in particular we will look at some early Arabic poems by Averroes.

You can use the bracketed form if you just want what amounts to passing reference to a source as in the following example.

In two recent works (Harding 1986a, p.80; 1986b, p.138) it has been suggested that ...

Example 3

St. Clair-Tisdall (1994, p45) said in his seminal paper on Organisation Synergy that "change in organisations is an inevitable consequence of growth" – this is an interesting observation and implies continuous IT progression and updating. Knowing this we can support Briggs (1999, p23) who said that OO is now routinely used in the computing industry.

This is poor because the first statement by St. Clair-Tisdal is clearly obvious and that by Briggs is common knowledge. Also it is not entirely clear that the second sentence leads logically from the first one. The point is that using citations here was unnecessary and therefore worthless. *We might have written.*

It is obvious change in organisations is an inevitable consequence of growth and in the modern world that must imply continuous IT progression and updating. Many authors, notably St Clair-Tisdall and Briggs have commented on how these naturally progressive elements may be factored usefully into a company overseas sales policy and....followed by your comments/discussion/analysis etc

Example 4 - Suppose you come across the following in a book by Noldeke. But the bit that interests you is by Frederickson – how will you set about properly using and referencing the Fredricksons quote?

Tools are needed if we are to measure software quality in a meaningful way. The idea of quality, as we know, is intangible since many views are possible. It follows that we must define some terms in order to measure quality. It is useful to note what Fredrickson said: "Definitions of what quantities we need to measure in order to assess software quality are at present arbitrary since as far as we know they have no connection with functionality".

This does not mean that they lack a rationale, but simply that professionals disagree on the definitions themselves and so it follows that

In this case the correct way is to find the Frederickson book and use that because it is the primary source. Quoting from secondary sources will only be tolerated in proven cases where the primary source cannot be found or for other reasons is inaccessible and it must be done in the correct manner as shown in Workbook 8 for secondary sources.

Example 5 – Can you work out what the following extract from a piece of student work is saying?

It is argued that tacitness, complexity, and specificity in a company's skills and resources can generate causal ambiguity in competency-based advantage, and thus raise barriers to imitation (Fahey, 1989). This is to rise a company's distinctive strategic positioning so as to possess some form of sustainable competitive advantage.

The sentences is obviously copied as it is very, very unlikely that any student would write with such academic complexity and obscurity – lines like this are not designed to communicate they are designed to impress the reader not further his understanding. What it in fact it is saying is that some skills are very difficult to duplicate and this may mean that growth may be restricted. We might have written.

Fahey in his 1989 monograph has stated what should be obvious but he nevertheless less shows conclusively that companies often do not realize that some skills are very difficult to duplicate and this may mean that growth may be restricted or if you like it's not all that easy to copy a skill. ... followed by your comments/discussion/analysis etc

5.9 Literature Reviewing Cautions

Writing a literature review is a difficult and time consuming task if it is to be done well and there are no short cuts to sound scholarly work so here are some final pointers.

Laziness - It is very common to see students write down things in a literature review as they occur to them. This practice might be fine for notes but it is obvious that the way thoughts pop into ones mind or information is discovered is most often anything but logical or structured.

Structure – to communicate in writing the work must have an effective structure that is well planned and allows the theme to develop to it natural conclusion.

Pretence - some students try to be scholarly and pack their work with quotations and paraphrases – this then become not an evaluative review of what was found but a recitation of it instead.

Non Review - some students just write down what they know without any references to the literature – this will always lose you marks as no one will believe that you obtained that information by your own brainpower without any outside assistance.

Experience – students often claim that what they write is all down to experiences but again no one will accept that. The way you use experience is in your evaluation of the sources, comments on them and building up your own arguments.

Inclusion – Preparation of the mind for your topic area does not mean you write down everything you know that might be relevant. What it does mean is being focused on your topic area and becoming expert in that. For example, an Engineering project where the literature review contains page after page devoted to telling the reader about every conceivable life cycle is hopeless and in such cases there is almost no thought over what is written and so it is worthless. Similarly, if a study project was looking at eCommerce as a way of selling drugs then page after page telling us about various drugs, treatments and prescribing practices is worthless in the context of just selling drugs. It's not volume is wanted but considered content.

6. WORKBOOK 6 – MAJOR PROJECT ELEMENTS

This workbook is intended to help students formulate clear project elements but here that what is said here is a mechanical process and it is your responsibility to make sure that what is written down makes sense.

6.1 Scope and Scale

Scope and scale are meant to be considered carefully otherwise a project which is out of control and way beyond your capabilities in the time available may occur. Alternatively, the scope and scale may be set so that the problem becomes trivial and the idea is rejected. So please take note of what these terms mean as far as this course is concerned.

Scope – this means something like selection or choice. So for example, if I were looking at training in desk-top packages I might select just Excel or I might select Excel and Access and so on to focus on. The point is I set my scope by being selective.

Scale – the means something like number or extent. So for example if I set my scope as looking at Excel I now need to set the number of users I will include in my study.

Scope and scale are two dimensions that set a frame around your work to bring it into sharp focus and exclude everything else. You need to put limits on both these dimensions but it is most important is to be clear about scope – that is, what exactly to include in your study, normally, just include ONE significant thing.

6.2 Presenting Problem

In any project it is usual to choose an area of knowledge and practice to be its topical focus. For example, one might choose modern usability issues, automated network management, digital paper and so on. Once one has a topic area like this it is necessary to choose a problem theme within it to be a sharp focus for a primary data research effort. It is best if one problem theme is chosen and its resolution or partial resolution would be of strategic business IT significance. In general, it is not all that easy to give a simple and all embracing definition of the notion of problem but the following has proved to be useful.

A problem or issue is something that is a matter of concern or debate within the topic area and whose resolution might bring benefits. (Checkland 2003)

In practice this means a problem is an object not an activity. For example, stating the problem as “how to ride a bicycle” is incorrect since this is not the problem it’s a question about the problem - the problem is “riding a bicycle”.

Another difficulty is that students often write down the problem in such a way that it is an answer or solution to the problem. So for example, if one writes a problem statement as “lack of training” then implicitly that is a solution as well. When this happens it is almost certain that the writer is not thinking about the problem at all but is obsessed with a particular solution. In this particular case the real problem might have been “errors in data entry” and one of many possible solutions is training.

6.2.1 Defining the Problem

It is always quite a good idea to construct one's own definition of the problem and to do it in as few words as possible. Notice, that it is your own definition not one you might look up in a book or on the internet (though you might start with that) because there is often little learning value in just copying a definition as far as deepening your own understanding is concerned.

Remember, that any definition one constructs will not be absolute and universally accepted by everyone - but in research this is not a problem as long as the researcher makes it clear what particular definition is being taken. Do not take this process too far and end up with either over-complicated or trivial definitions - they must be thoughtful and comprehensive. So it is recommended you start by thinking about four things where the acronym CAPE is used:

Characteristics – observable features or facets of the problem idea,

Associations – every problem will have links to other situation elements,

Perspective – when a problem is encountered it will always be from a certain perspective

Effects – say what effects ensue in the real world if the problem is not resolved.

6.2.2 Defining the Problem - Example

Let us suppose that a student has identified the problem theme as Phishing. Naturally, the student will be concerned that this is a good idea and would like confirmation of that before expending time on it. One can

ask the course tutor, but he/she is not expert in everything so at best one would only get an opinion as a response so how should a researcher proceed. So for Phishing a researcher might note the following:

Characteristics: illegal, intrusive, upsetting, preys on those who trust their fellow man, etc

Associations: email, chat, file sharing, etc.

Perspective: management (but try to look at it from several perspectives as well)

Effects: destroys confidences in the system, may lead to personal or company losses etc

Normally, it takes quite a few attempts before a definition that is lucid and comprehensive is obtained. Remember, the definition must also be useful within your research study – that is, it's no good having a well formed definition that does not offer a sound basis for a research effort.

Now here is a first attempt

In the modern world email is a technology that almost everyone uses whether in the home, at work, on the move and indeed it seems to follow one around. Typically, email is a simple one-to-one message passing technology but it is now offered with enhancements that include voice, video, chat, file passing, file sharing where suppliers are attempting to present a complete communication environments. With such a technology come problems and one such problem is identity theft and one way of getting this is known as Phishing. In its simple form an unknown, but apparently authentic, source asks for personal details and then uses them for fraudulent purposes. The problem is identity theft using email systems where a message poses as a legitimate requestor in order to fool the recipient into thinking it is legitimate request. The problem in computer system is known as Phishing.

Here is a final attempt (but most often there are several intermediate attempts)

Phishing is identity theft using email where a personal message seeks confidential or private information from its recipient whilst posing as legitimate request. The intention therefore is to fool the recipient of the message into releasing information which can subsequently be used for fraudulent purposes.

6.2.3 Cautions on Problem Definition

The acronym CAPE is just an aid to formulating a definition so one should not worry whether something is a characteristic or an effect - that does not matter very much because the whole idea is to uncover problem aspects and expand one's understanding of the problem theme.

As a very rough guide one often finds that the final definition must come down to about a third of what we start with. In most cases if one is familiar with the subject it is possible to create a good definition in about 1 to 2 hours and then if necessary update it as your project progresses as it is almost certain that there are elements that have been missed or imperfectly understood.

6.2.4 Problem Size

It is hard to measure the "size" of a problem because there is no scale on which to gauge it. But one can look at two aspects to get some idea.

Current Effects – think about the effects of the existing problem and try to assess their seriousness in terms of the context in which it is set. In simple terms just ask "is it worth solving".

Form of Answer – perhaps a better guide is to think about the form of answer and see how extensive, important and how hard it is to get. For example: one student wanted to deal with password overload – a clear problem with which we are all familiar but his outcome was a set of guidelines on how to construct good passwords but in my view that was a trivial answer to the problem because those guidelines can be found almost anywhere and it is doubtful if that goes anyway to solving the overload problem.

6.3 Project Target

When you think of a problem you normally do it in relation to its effects. It follows that you have to think very early in a project about what effects will be generated if you can resolve the problem – these real world effects are called the project target. Normally one settles on one major target although it is permissible to list more than one. Targets are effects so these are typically introduced by a verb form (increase, reduce, remove, reduce etc) and tend to be such things as: improved accuracy in data entry, to gain infrastructure resilience, streamlined workflow and so on.

6.4 Project Outcome

It is obvious that at the start of a project we do not have its outcome – but we can have some idea what its form may be. Therefore if we know our target we can speculate about what could be generated as a project outcome that might generate or go some way to generating the desirable target. It follows that whatever we

decide is the form of outcome we are looking for in the MSc project it must credibly be able to generate the stated target. Outcomes are objects and so are typically expressed as nouns: Here are some examples:

The target of “improved accuracy in data entry” might be generated by a project outcome of a training needs assessment report or a training plan.

The target is “to gain infrastructure resilience” might be generated by a project outcome of a revised backbone design or a set of recommendations for new technology.

6.5 Problem, Theory (Speculation) and Form

It is often useful when thinking about the solution to a problem theme to think of it as based around or generated by some personal theory a person holds about that problem and its setting. Essentially, one gets at this theory by speculating about causes and possible solutions routes. It is not easy to say how to speculate but it can be said that it is aided by a thorough literature review, personal experience and a deep consideration of the problem theme perceived in a given situation.

For example suppose the situation was related to issues with application software implementations in business not being as successful as expected. Recognition of this problem theme is a first step but if one is to do something about it, it might be useful to thoughtfully speculate on why success is lacking in this area. It follows that one might speculate that this lack of implementation success is due to poor implementation strategies, or poor user training, or poor project management or any number of things. Notice that there will always be rival speculative ideas and that is why one must be thorough in looking at the literature and using your basic knowledge and experience to open up the situation in order to at least have a credible theory as to the most probable solution route otherwise one might just waste time on chasing nothing of value.

Do not let this idea run away – this is not about natural laws of the universe such as Ohms law or Archimedes Principle – here one tries to establish a personal belief about a situation and its problem theme. So after speculation one might express ones personal theory about the above example as follows.

It is believed that implementation of application software is proving difficult and this may be due to poor implementation strategies. It follows that if this is the case and better strategies can be defined then implementations may prove more useful in the future.

Notice that my theory points to a particular form of answer to this problem theme and in this case it is related to perhaps a document that explains how to formulate implementation strategies based on a consideration of user needs, application intention and business objectives.

Occasionally, the theory may be embodied in a scientifically constructed hypothesis but more often than not in technological research it is expressed informally as an idea.

6.6 Primary Data

Primary Data is data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

6.6.1 Primary Data Collection Protocol

Within every project there has to be a collection protocol for the practical collection of the primary data. Every complete protocol will have 5 features:

Vehicle – this is the primary mechanism or technique employed by the researcher, typical examples are: interview, questionnaire, observation, role playing, seminar, focus groups, document searching and so on

Recording Profile – this describes how the data will be physically recorded. Typically we might use: written report/transcripts, formatted record sheets, video, sound recording, computer logging, excerpts from documents and so on.

Sample criteria –this is a profile that allows the researcher to know that he/she has a valid sample point from which data is to be collected. For example, if we wanted data on business uses of Digital Paper we need a profile of who we should ask for that information. If we do not have a profile we may not have any consistency in our data and it may therefore be meaningless.

Permission – you have to feel certain that the information you seek is legitimately available to you.

Ethical Profile – you need to be clear as to what you are doing, the way you are doing it and what you are asking for is ethically acceptable. Two things are at stake: the results may be biased and the results may not be acceptable.

6.6.2 Project Purpose in a Nutshell

Students sometimes get confused over what a Master's project is about. Consider a topic area like Digital Paper which is likely to be a very hot technology in 2006/7. A Master's project is not about producing a long narrative on Digital Paper explaining what it is, how it is used and what the technological infrastructure to support it might be. A Master's project is about identifying a problem theme in Digital Paper and then collecting and processing primary data into a form that helps you resolve that problem theme based on ones own personal theory. With this in mind, consider the following examples.

Example 1. Suppose I want to define all the various accounting functions so I pick up a manual for my in-house accounting system and then go through it looking for all the various accounting functions and listing them – is that primary data and is this a valid research purpose? No because in the first place one might just regard the manual as listing the functions anyway so in effect the data already exists, secondly, this is just one book and so its content might be complex, trivial or totally unrepresentative.

Example 2. So if I extract (my basic activity) instances of phishing (my problem theme) from an email log that would be primary data because even though the email log (secondary data) obviously exists, the list of phishing instances (my primary data) as a collection did not. My purpose being to process this collection of primary data to find out the most common sources of phishing and express my findings in an evaluatory report (my form of answer).

Example 3. If I conduct interviews in order to describe (my basic activity) a user purpose regarding illegal downloads (my problem theme) in my company with selected employees the interview transcripts are my raw primary data because the transcripts did not exist before the interviews took place. My purpose being to process this collection of primary data in order to develop a policy (my form of answer) to control illegal downloading activity.

Example 4. If I look through written reports (secondary data) on security violations (my problem theme) for a particular company with a view to identifying (my basic activity) the root cause of each violation then even though the violation reports exist the list of root causes (my primary data) did not so it is primary data. My purpose being to process that collection of primary data to create a strategy (my form of answer) that will alleviate or remove certain kinds of violation in future.

Example 5. If I plan to build an application for processing student MSc marks (my problem theme) then I need to ascertain (my basic activity) the system requirements (my primary data). My purpose being to process this collection of primary data to create a design (my form of answer) for the marks processing system.

6.6.3 Pre-processing Primary Raw Data

In many cases it will be necessary to process the raw data that one collects into a structured form of some kind so that is easier to use when generating the final project outcome. For example, if we have a series of interview transcripts it is obvious, that in that form, they are not easy to use so we might perform a pre-processing phase to get the core data into more structured form that then constitutes our primary data collection before the main processing phase that generates my project outcome is carried out. For example, suppose I examine company documents on misuse of IT system resources by employees. In this case I might proceed in two ways to get my structured primary data collection.

In line processing – that is I define my structure before I start and then as I come across a misuse example I structure it there and then. However, the disadvantage here is that you have to continually look back to see that you are not recoding the same data again and again from other incidents and so it tends to disrupt the collection process and make it longer to complete.

Pre-processing – here I wait until I have been through all the documents and then I use my set of notes to systematically work through the whole raw collection and form my structured collection that way.

6.7 Writing a Research Question (Study Projects)

This is intended to relate to the core problem that your research is trying to resolve. Make sure it is a clear question. Ideally one wants an open question: that is one that does not just end with a yes or no answer. This is often quite difficult to achieve but it can be done if you work at it.

A question is an expressions normally used to request information the form of an answer. Questions can sometimes be like commands used to elicit a response and others such as "Would you pass the salt?" looks like a question but in fact is a request or action, not for an answer. In Research Methods, however we will only look for questions that elicit information.

The simplest questions implicitly or explicitly request information from a range (finite or infinite) of alternatives and these are often called bi-polar questions. An interrogative word is a word used to start a question. In English the following is a list of interrogative words although some of them are rather old fashioned now.

Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, is/are, and can.

6.7.1 Questions that are not Questions

It is often difficult to write something that in English could be taken as a question. Now I am sure that in daily life everyone knows how to ask a question but when you write something down you are entering another world. Consider the following two lines – would they be understood as proper questions?

How to sharpen a pencil? Or What a pencil can do for you as a student?

Now these clearly ask for information but if you spoke these fragments to someone they would not quite see it as a proper question – in English such fragments would be understood as a kind of heading to a list of instructions for sharpening a pencil or a list of the benefits of using a pencil.

6.7.2 Basic Research Question forms

It is best when attempting to construct a question to think about what sort of answer is to be expected – now in normal everyday life we do this instinctively. For example, you would not say "is this the right way to Pablo's restaurant" if you wanted actual directions because that question form could only give you a Y/N answer. Instead you would probably say something like "how do I get to Pablo's restaurant from here" and reasonably you would expect an explanation to that question. Broadly speaking there are four sorts of answer:

Bi-polar answers - Essentially questions that imply a limited range of possible answers. Typically, a bi-polar question starts with a word such as WHAT, IS, CAN or DOES.

Is it possible to sharpen this pencil? (Y/N)
Does it make sense to allow children to sharpen pencils (Y/N)
Can a blue pencil be sharpened easily (Y/N)
What is the correct pencil weight for drawing a picture? (HB1, HB2 etc)
What is the common view of staff about using blue pencils? (Disagree, agree, etc)

Bi-polar questions can of course be useful but more often than not they have no great utility and the answer is obviously yes or no. Consider the question: "Can a green pencil be used in place of a red one?" Well of course it "can" be used so the answer is bound to be YES and so the question is pointless. Sadly, questions in this form occur all too frequently in student work and whoever writes such questions is not thinking at all about what information he/she want to elicit.

Explanatory answers – where the expected answer is an explanation and it is often in the form of a procedure or process. Typically, explanatory questions that start with 'HOW' or 'WHY'. For example, "How can a pencil be sharpened safely by young children?"

Descriptive answers – where the expected form of answer is a description most often in the form of an evaluation. Typically, these questions start with WHAT or WHY. For example, "What is the purpose of HB0 pencils?" (a simple explanation) or "Why are HB0 pencils difficult to sharpen?" (an evaluation)

Exploratory answers – where the expected form of answer implies an answer as an exploration of something. Typically, exploratory questions start with HOW or WHY. For example, "How should we use HB1 pencils best in drawing figures?" (often an exploration is needed here leading to an explanation)

Good interrogative words to start questions are: what, where, would, in what way, can, is it, why, which, where, how, does, who, why, do, etc – whatever word you use always ask what form of answer is implied by each of them. You must be sure that whatever form you decide on as answer that you can actually construct it and when it is constructed as part of your research it is in fact useful strategically in some way.

For example, suppose I decide that the form of answer I want is “The role of technological innovation is business success”. Well the task you now have is to now ask yourself whether you know how to express a role (write it down if you like) and whether knowing about this role will be of any use.

6.7.3 Research Question – Why are we asking it?

In normal everyday life questions come at us more or less all the time. Sometime we just answer them but more often that not we have a tendency to ask “why do you want to know”? It is therefore always useful when setting out your research question to ask why you asking it. That is you say to yourself, if I have the answer to this question then there will be some good outcome because of it. Sometimes we embed in our questions why we are asking them but mostly we do not. You will see later however, that you will have to make the reason plain in the aim so one might as well think it through at the question stage as well.

6.7.4 Research Question Form of Answer

For any Research Question there will always be several possible forms of answer arising out of ones personal theory about a problem situation encapsulated in the question. Ideally one would like the research question to be worded so that ONLY one form answer is possible and that is the one our theory suggested but often that is not easy to do so one normally has a range of options and competing theories to choose from so one looks for a form that interests you or looks to have the most utility. Do not be tempted to have multiple questions all in one sentence or look for multiple answers since it is better to focus on one significant output form. Table 4 lists the main forms of answer to help you when considering your personal theory.

Category	Typical Interrogatives	Expected Forms
Bi-polar	does, is, are, what, when or can	A list of possibilities
Explanations	how, why, who or where	A report, a model, an equation, a theory, a design, an evaluation etc
Explorations	How, who or what	A list, explanation, a comparison matrix, a pattern, a survey report, a theory etc
Descriptions	What, who or why	A report, a process or procedure, a model, a policy, a strategy, a theory etc
Table 5. Research Question Outcome Possibilities		

6.7.5 Strategy for formulating a Research Question

There is no easy way to do this and no real templates for it either so a good formulation will require some clear thinking and effort. What follows is a typical structure that you might use, but do not feel limited by it. The order in which these structural elements are presented is usually IPSTS but do not worry too much about this as long as your question is lucid but on the other hand do not be careless and end up with a question about the suggested outcome instead of about the problem (**SPITS** for short)

Spotlight – try to put the spotlight on where the primary data or information needed to answer the question might help come from.

Problem – this is about focusing on a single problem, so try to be as concise as you can.

Interrogative – what is your key interrogative word (how, why, what etc). You should note that some interrogatives need to use two words if a proper question is to be formed. For example, “how” on its own will not normally make a question but when you say “how can..” it is clearly a question.

Target – think about what will happen in the real world if you can resolve the problem. For example, it might be your target was to gain efficiency improvements, provide or enable better communication, increased accuracy and so on. It is also possible, but usually unwise, to state the target negatively if this makes the wording of the question more natural and you will see examples of this in section 6.7.

Suggestion – here one thinks about the problem theme and simply asks what sort of answer and what form it might take. So sort of answer might be yes/no, an explanation, an exploration, a description and these sorts of answer might be expressed at the end of the project as a report, a model, a list and so on.

Here is a student work example - "How can (interrogative) the billing cycle time (problem) be reduced by identifying and defining best practice accounting (suggested outcome) in order to improve the quality of response (target) to customers by reviewing the initial accounting processes stages (spotlight)?"

It is not always useful to add in the data suggested outcome because sometimes it can limit ones speculation about causes and solutions and in any case.

6.7.6 Function of a Research Question

The function of the research question is to crystallise the problem and desired effect (target) of any solution. But doing this is only useful if it allows the research enough room to theorise or speculate about possible answers so that indeed the solution space can be explored. Consider the following formulation:

"What factors influences the development of sound IT project management working relationships?"

Here we have in a solution because we are told that the problem is "working relationships" and what we want as a target is sound working relationships. But we in effect we are told to look for factors and so the solution to this problem theme will be a list of factors. The trouble with doing this is that it cuts off any further speculation about dealing with this problem idea and so the question becomes rather pointless.

6.7.7 Meaning in a Research Question

This section has looked at the structure of a typical Research Question but that is all it is and students must not treat it as some sort of template – it MUST be thought out step by step and even then one has to think does it make any sense, is it a focused question, what sort of answer should I expect and so on – there is simply no substitute for careful thinking.

Once you have formulated your research question and have a good idea what form the answer will take then its time to test it using the following ideas. Now be aware that this is just a test of structure and of itself it does not mean the question makes sense – there is no way to do that other than using your own brainpower and common sense – if it makes sense to you it will probably make sense to whoever else looks at it.

English – does it read correctly in English as a question?

Paraphrase – if it's a good question you may be able to ask it in several different ways – so try to do that until you get a formulation you are happy with.

Bi-polar – this means that the question has a fixed and limited range of answers such as "Y/N", "bad", "good", and "excellent". This type of question can of course be useful but the problem with them is that such answers do not have much utility – that is they do not tell you anything of value in terms of what action or actions you might take. You are advised to avoid such questions for your project.

Discussion – look at your question and honestly ask 'will this question produce discussion?' – what this means is to ask 'who am I writing this question for and would it interest them'. Try not to think that you are doing this for your Research Methods tutor but try to think what you would do if you were trying to get funding for research to get an answer to the question from someone.

Answer Form – try to work out what form or forms the answer will take (typically: bi-polar, explanation, description or an exploration) – if you try to avoid this aspect you may find yourself in serious trouble with your research.

6.7.8 Common Errors in Research Questions

The following are typical errors found in student written Research Questions – they can all be avoided if one takes just a minute to think through what has been asked and what sort of answer is likely.

Not a Question - to an English speaker the following would not sound like a question, instead it would sound like a heading to a list of instructions or a procedure. "How to make business application development productive at XYZ Corporation?"

Multiple Questions – It is never a good idea to try to put TWO (or more) questions into one as in the following example - one is about testing and one is about bugs they are quite different things. "How can software bugs be minimised and the testing cycle shortened in the development process of an Inventory System?"

Obvious Answer – these are cases when no research is needed because the answer is either obvious or common knowledge. Questions like this show a serious lack of thought – take the second example and it is easy to see that the answer to the question is bound to be YES - of course a productive work-life balance "CAN" (but might not) be obtained so there is nothing of any value whatsoever in a question like this. Similarly, it is easy to explain how a better development process can increase productivity.

"How can a better business application development process increase the productivity at XYZ?" or

"Can a productive work-life balance be achieved with telecommuting for technical personnel?"

Please remember that it is possible to write a very poor question that exhibits more than just one error type. Again, there is simply no substitute for thinking about what it is you have written.

6.8 Primary Data Generation with BAGeD

Based on a problem theme, theory and the form of the project outcome expected one needs to formulate a process to create a unified collection of primary data. There is no algorithm for doing this and one has to go carefully through the steps: define the data (BAGeD), locate the data and decide on a protocol to collect that data reliably.

Spotlight - The core of this primary data generation process is to find an activity whose execution effectively points to the right data so that you can formulate the whole collection plan around that activity. This core activity is called a Basic Activity for Generating Data (acronym BAGeD) and is the activity that one performs to generate the primary data that you want. Think of the BAGeD as a sort of spotlight that is focused just on the primary data that one needs and nothing else. That is the spotlight illuminates the data that you want in the sense it tells you how to generate primary data items but not how to actually collect that data.

With a BAGeD it is ideal if you can find just one verb to describe the activity. One needs to be careful here that the activity is clear since almost all verbs need to be qualified or supported by stating what the object of the activity is. For example, if I were to say, "look at fault logs for my primary data" then that is very indistinct because it does not tell us what to look for (the object of the looking). But if I say, "look at fault logs to describe instances of SPAM attacks" then I now have a more distinct activity because I know what I am going to write down as my primary data. The whole primary data collection process is then fitted around the BAGeD and the detailed planning to get the necessary data can then be made.

Example - suppose the problem theme is the value of training. Clearly a lot of money is spent on training so it might be really useful to know if there is a link between it and productivity. Suppose we speculate that the link is to do with essential business working practices and these change over time to meet new needs so that what I need is an answer in the form of a process model on how one identifies changes in business essential working practices and links them to a training initiative.

Now that I have my theory and form of answer (a process model) the Basic Activity for Generating Data can become **describe changes in essential working practices** of key operational staff – thus, my Basic Activity is "**describe**" and the Primary Data will be **changes in essential working practices**. In practice you might try several ideas before you are happy with one. Now I have this core activity I can work out the full process of getting to the data and processing the resultant collection to get my process model (outcome) that describes the link between business essential working practices and training.

Once the BAGeD is clear it, is an easy step to say how that data will be collected. In the above example I might use interviews with relevant staff. In summary the whole process becomes **describe changes in essential working practices** (BAGeD) using **interviewing** (collection protocol) with relevant staff.

6.9 Getting a BAGeD

The Basic Activity for Generating Data (BAGeD) then is an idea that allows you to spotlight exactly the data that you want. So we are looking for an activity and we hope that activity will shine a spotlight on the data. There are only three real considerations:

Problem Area Expertise – it is obvious that you need to have gained expert knowledge in the topic area and in the particular aspect related to the problem theme you are dealing with. In general, depending on the topic, this might include things such as: knowledge of the technology, management and usage processes. Unless you have thoroughly prepared by using literature reviews and/or other means you will simply not be in a position to know enough to be able to decide competently what data it is possible to collect.

Intended Outcome – fix in your mind what your Research Design is trying to generate as an outcome. With the above in mind, recall that whatever data you collect will be first formed into a structured primary data collection during the pre-processing phase, which follows immediately after collection, and then that structured collection will be used to generate your outcome.

Let us suppose the outcome is to be a set of guidelines, so you have to think what sort of primary data is needed to be able to generate the guidelines. This means you must know what guideline means and how one is constructed and that is where secondary data comes in. So in this case you might look at text books or journal articles to find a guideline model to use. Additionally, you would look at examples as well as look at any relevant company or international standards.

Collection Protocol – the last thing to consider is can the data be collected and if it so, what is the best way to do that. So it's not a matter of just choosing anything that comes to hand, it is a serious practical consideration based on a thorough and logical analysis of the sort of primary data that you want.

In the guidelines example above, the idea might be to use a questionnaire and one has to ask would a questionnaire allow for the collection of the data I needed. Let us suppose that the data we spotlight is: IT media and usage. Now it's obvious that a questionnaire can easily get media data but it is not clear how it could capture usage data so I might decide to get that information by interview instead because I want a much richer picture there. The point is that guidelines are largely about usage so that is where I must direct my effort.

To elaborate, usage is a complex issue and if you try to get it with a questionnaire you are going to have to have a very good idea what the usage processes are and so it may miss lots of things that are going on in the company setting. Whereas, if I use an interview, I have much more opportunity to explore the usage idea and that is what I really want.

6.10 Research Question, Form of Answer and BAGeD Examples

Consider the following further examples which focus on the BAGeD (your data spotlight) and linking it with some theorising or speculation about an expected form of answer. In each case several possible forms of answer are listed but in a research study only one would be chosen for further work.

One needs to be careful – this all sounds fine, even clever but a researcher must seriously consider if a complete process built around the BAGeD can be formulated in order to get at the necessary data within the time and other resources that are available.

RQ = What limits investment into e-applications for SMEs in Hong Kong leading to a loss of competitiveness?

- A list and description of investment constraints or
- A strategy to deal with the investment constraints or
- A feasibility report on e-application implementation or
- A post implementation review report or
- A prediction reacted to the effects of the constraints

Let us suppose that I choose a list and description as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on reviewing investment plans and the corresponding strategic plan in order to identify (Basic Activity) the possibility of an investment constraint (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect investment and strategic plans (secondary data) and by a process of review I identify and extract key investment decisions in the investment plan linked to a strategic plan. So my primary data will consist of a list of identified investment constraints, which I will need to explain.

RQ = How can IT operational criticality be monitored and controlled in order to build effective business systems?

- A process of data criticality categorisations or
- A user guide to data criticality or
- A DRP/BCP policy document or
- A report explaining how data and criticality are related

Let us suppose that I choose a DRP/BCP policy document my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on listing data categories and using these categories I review reported critical incidents related to data categories in order to match (Basic Activity) the category to the criticality of the incident (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to collect category

data (secondary since they must exist in this case) and collect incident reports (secondary data) and by a process of evaluation of each report extract incident details and categorise them (my primary data). So my primary data will consist of a list of categorised critical incidents.

RQ = How can supply chain logistics be improved to provide continuity in manufacturing systems?

- A evaluation of a modern supply change process or
- A feasibility report on RFID or
- An implementation plan for RFID or
- A model that shows how improvements may be made using RFID

Let us suppose that I choose a list of implied benefits all explained as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on describing (Basic Activity) supply chain tracking problem themes (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify tracking problem themes and by process of evaluation of each problem theme I analyse how RFID might alleviate that problem theme. In essence I extract key reported problem themes and possibly categorise them (my primary data). So my primary data will consist of a list of categorised problem themes in supply chain tracking.

RQ = How can an improved personal communication protocols be established leading to productivity and business success?

- A feasibility study on IM and its use in offices or
- The definition of a training programme or
- A series of factors that must be in place before IM adoption or
- A cost/benefits report or
- The design of a regular monitoring scheme to assess effectiveness

Let us suppose that I choose a cost/benefit report as my expected form of answer. Now I have to find a way of getting at the data I need – the Basic Activity for Generating Data. So I decide to focus on analysing (Basic Activity) call content with regard to costs (Generated Primary Data). Now I can see more clearly what my data is going to be. Here I need to identify the sort or calls and then extract the cost (easy) and assess the benefit (hard) and by process of evaluation arrive at my report. So my primary data will consist of a list of calls and their associated cost and benefit.

6.11 Writing an Hypothesis

This matches with your research question and amounts to you saying what you think to be true in a given situation. It is in essence an extension of your form of answer where you try to say not only the form but what you think the answer will actually be. When you do this your work then become a process whereby you try to show that your hypothesis is valid. It is quite difficult to write a suitable hypothesis. There are three stages: firstly write the null hypothesis, secondly write the alternative hypothesis and lastly write down the dependant and independent variables. Unfortunately many new researchers seem unable to do these things satisfactorily. Let me illustrate.

A student wanted to write a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (Dependent). Now this will ONLY makes sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified. Now in research people tend to treat the idea of hypothesis in two ways and the second way is often quite valuable in many research situations.

6.11.1 Formal Experiment

To set up a formal experiment one creates or identifies two samples: one exposed to some effect and one not. For example, suppose I were looking at whether a new diet called lose-weight-quick worked or not. I could set it up a hypothesis and look for samples where some people were exposed to the new diet and some were who were not. The experiment then amounts to seeing if there is any significant difference between these two samples. (See notes for how to set up a formal hypothesis)

In a sense we are trying to prove the diet works but that notion of proof needs very careful understanding. The point is that it is very likely that the diet will work for many in the sample and not work for others. So our proof carries a qualification which is that all we could reasonably say at the end is that the diet is likely to work for a large number of people (or not as the case may be). A second point is that we do not usually do thousands of similar experiments and so at best our results for a limited sample would be tentative. Notice

that this outcome is quite different from an experiment that sets out to verify a natural law like Archimedes principle or Ohms law where the amount of variety is much, much less and of course such natural laws have been tested many thousands of times so we are assured of their validity.

6.11.2 Informal Idea

Instead we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies to demonstrate this. Notice that we are NOT proving anything here only suggesting that something may be true.

6.12 Writing an Aim and Objectives

For each project we want one overall aim and a set of objectives that collectively will generate the form of answer that has been defined (project outcome). An aim/objective is expressed as an activity to get to a defined and measurable outcome within the scope of the project. The essential difference is that the aim expresses the target (or purpose) for the whole project outcome whilst objectives perform the same function within the project itself. Every time you write an aim or and objective you have to ask three main things with the abbreviation JOB – so when you write an aim or objective make sure you do a good JOB of it.

Can Justify – this really amounts to asking if the aim/objective make sense in that it generates a minor project outcome within a particular aim.

Can Observe - Make sure than someone else can observe or check what you have done, normally this means you can document it in some way (in words, diagrams, charts, graphs etc) in your project document. For Engineering projects this also means that the application is visible to all markers.

Can Build - Make sure that YOU can build the outcome stated.

6.12.1 Project Aim

This derives from the project problem definition and is best thought of as expressing the overall activity and intention of the project to generate an outcome that can be placed in the project document or made easily visible to the examiners. It has a number of elements as follows although when you write your aim you do not have to do it in the same sequences as expressed here and you may write it in any way that best captures your ideas although doing it in this sequence tends to be more logical.

You will note in the aim structure that follows that the problem theme is not explicitly mentioned and we infer what it is by looking at the target. The reason it is not included explicitly is that when one does one tends to get very awkward constructions linking problem and target so we might see absurdities such as “to improve website accessibility because web site accessibility is problematic”. The structure of a good aim is as follows where we can use the acronym ASOT to remember it.

Activity – what must be done with the available data to get the project outcome? Ideally, look for a single activity that sums up the whole project process for generating the intended outcome.

Spotlight – where will the basic data used by the activity come from?

Outcome – this element says how the project outcome will be expressed knowing that this outcome will later be used to generate the real world target. If the Research Question expects a model as an answer then the aim must have the same form of generating the model. Similarly, if the application description states a system to do X then the aim must have the intention of generating system X.

Target – what is the real world intention? That is the project outcome should be useful in the sense that it addresses the real world problem theme on which the project is based.

Aim – to create a website structure design using cascading style sheets in order that it might be used in design to improve web site accessibility.

Activity = create, **Spotlight** = cascading style sheets, **outcome** = web site structure design and

Target = to improve accessibility.

Sample Aim 1 – “To create an improved network infrastructure”. This is unsatisfactory because we have no target - we know that there will be an improved infrastructure but we don't know what effects that will have. So is improved infrastructure the outcome – it cannot be because it would imply sending to Portsmouth for marking some object called “improved infrastructure” and that is an absurdity. So here we

have no target and no outcome and we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

So if I just use the above example it would be possible to have a target of a reduced network down time because of the Improved network infrastructure but that could ONLY happen after the project completes and in the project one could generate an infrastructure design - now that can be completed within the project period and later used to build the infrastructure which can then be used to generate our reduced network down time. Another factor here is that we cannot measure whether something called improved network infrastructure (what scale would we use?) has been achieved unless we have a target such as reduced down time which of course we can measure.

Sample Aim 2 – “To build a Wi-Fi implementation strategy”. This is unsatisfactory because although we know the project outcome is an implementation strategy we do not know what value it has in the real world because we have no target. Notice also we are not given any spotlight area for the work so we have no idea what will be used to get to the project outcome.

6.12.2 Project Objectives

The aim expresses the overall outcome for the project but to get there we normally have to pass through a number of minor outcomes on the way and these are expressed as being generated by objectives. For example, an objective that sets out to build a model of the software construction process could easily be a minor outcome for a project dealing with the construction of web sites but could also stand on its own in the sense that it is a useful outcome whether the project is completed or not. Conversely the design of a set of interview questions is most likely not to be an objective but a simple project task since it is something that needs to be done but only has meaning within the project.

Since we are looking for minor project outcomes that collectively deliver the project outcome we have a little problem here because any project is made up of a series of tasks, some of which will generate a minor project outcome and some will not. For example project tasks range from preparing the contents list to evaluating the project outcome. A possible rule for deciding if a task leads to an objective is:

Ask is the object produced by the task something that could stand on its own outside the project and in that sense valuable in its own right?

If the answer to the first is “Yes” then it is likely to be a task that leads to an objective. Please take care; this is just a “rule of thumb” so look for things as minor outcome that are real milestones to getting the project finished. It may be useful to think of the project as a pyramid where the final project outcome is at the top and below it are layers that have been generated progressively from objective minor outcomes so that we eventually get to the top.

The format for an objective is much the same as for an aim but with no target and two added features in that they must be progressive and bounded. There is only one aim but there may be from 3 to 6 objectives that show a progression that leads us to the overall project outcome.

Progressive – objectives must build sequentially so that collectively they amount to reaching the aim.

Activity – Ideally we look for a single activity that will generate a minor project outcome that can be expressed in a form that can appear in the project document

Spotlight – what is the data area focus of the objective's activity?

Outcome – In this element you say how the outcome of your objective will be expressed knowing that this must be in a form that can be written into the project document.

Bounded - objective outcomes must be achieved and available within the project period and must not refer to anything that might occur after the project document is completed and submitted

Example – To model and document the software development process.

Activity = model, **Spotlight** = software development process, **Outcome** = a document, Bounded – yes we can do this activity within the project period (in this case we cannot show progression as that only applies to the complete collection of objectives)

It is easy to become completely muddled with objectives and one source of this muddle is the distinction between a project objective: one about what a student can do and evidence in the project document and operational ones: those that have some real world effect that might happen after the project has been completed. In simple terms if you set an objective in your project it must be completed within the projects time scale. Let us just take an aim and look at some possible objectives.

Aim = To report on how the bicycle is an aid to mobility in a modern urban environment

Sample Objective 1 – “To list in a report the components of a modern bicycle”. This is fine since clearly it is something that you can do and evidence in a project document so somebody else could check what you have done.

Sample Objective 2 – “To describe how a bicycle functions”. This is no good since although it is clear that you can develop a description, no one can check it unless you write it down. Better to say “To describe by means of annotated diagrams how a bicycle functions”

Sample Objective 3 – “To understand how a bicycle helps urban workers”. This is no good because although you can do it no one else can check it. Better to say, “To prepare a report explaining how urban workers could be helped by the use of a bicycle”.

Sample Objective 4 - “To ensure that workers get to their office on time by using a bicycle”. This is no good because you cannot do it and if you cannot do it no one can check what you have done. It also sounds more like an aim than an objective because it hints at a target. Better to say “To report on bicycle usage strategies that might be applied by urban workers to ensure they get to work on time”.

Sample Objective 5 – “To implement a bicycle repair system”. This is no good since you can clearly do it but it cannot be checked in your project document. But you could say “Report on the implementation of a bicycle repair system” or “Produce a design document for the creation of a bicycle repair centre”.

Sample Objective 6 – “To ensure that bicycles conform to BS 7898”. This is not really much good as it is in essence a requirement and not something that one can do within a project itself. However, one might have written “To prepare a report showing how a bicycle can be evaluated for BS 7898 compliance”.

6.13 Words needing care in Aims, Objectives or Research Questions

The key thing is to look at the main verb (activity) you are using and ask ‘does it tell me what to do as a practice’, if not then its use is suspect. A good way to assess if the verb is strong enough is to connect it with an outcome. So we might write ‘Create a framework...’ – here we have the activity ‘create’ and the ‘outcome’ a ‘framework’ and it is easy to see that it can be done.

6.14 Writing a Title

The title is the name of your project – rather like the name of a novel, something that catches a potential reader’s attention but just gives a hint as to what the work is all about. Think of it as a kind of nickname or slogan for your project and as such it is not a good idea to try to use the same set of words for the title, Research Question and aim. Titles typically have two elements:

Aspect – this is the particular focused area of your study

Why – this says why it might be a useful aspect

Mentioning the means by which you solved your problem should only be included in the title if it is crucially important. As an example, suppose your project was concerned with the development of a database and you used Microsoft Access. Unless your project compared your product with a similar database implemented in Oracle, say, then the tool you used to solve the problem is not as important as the problem you set out to solve.

Be careful with titles, there is a tendency to use the title to say what you will do. The purpose of the title is to give a concise name to what you do. Avoid noise words or phrases such as: “A report into...” (redundant: of course it is a report!) or words like “study”, “investigation”, “enquiry” and “development” are often similarly just noise. It is also usually very unwise to express the title of your project as a question although a title in the form of a proposition is often quite useful as in example 1 below. Here are some examples of good titles:

Planar Similarity – A Possible Software Quality Measure
Heuristics in the Stages of Soft Systems Methodology
A Taxonomy of Heuristic Problem Solving

7. WORKBOOK 7 – BASIC RESEARCH METHODS CHECKLIST

In research we are usually trying to do one or more of the following: understand something, explore something, describe something, explain something, improve something, build something or prove something. To do any of the above, you will have to decide what data you want to collect and choose rationally a research method as your primary research vehicle and build a research design around it.

You need to exercise care here so as not to become confused between a Research Method, which is a framework or model for the whole research project, and Data Collection Protocols, which are vehicles for actually collecting the primary data and might include such things as interview, observation, questionnaire, seminar or role playing.

What follows is just a summary of the methods and further information can be found in the associate project notes and there are many books available on each of the methods listed below. There are many research methods but the list below presents the major ones.

7.1 Research Styles

This is a practical notion and you would be wise to think project ideas through in terms of these styles. There is no sense that one or other is superior and no reason why both should not be applied at the same time.

Quantitative – a style that represents information in numerical form. The numerical form might be graphs and statistics which can be used to show trends, comparison and similarities and the graphs might lead to equations which link variables or allow one to make generalisations.

The advantage of quantitative data is that there is solid evidence that can be permuted in a variety of ways to support or not support a contention. In general, one is counting the frequency of some event – say the number of times the user selects the wrong icon but, and it's a big but, the data is only truly valid in the context in which it was collected so one needs extreme care if we want to generalise.

Qualitative – is typically used to analyse how certain actions occur not just how often they occur. The information is usually represented in textual form of some kind as a description of some observable event or events. The usefulness of this is that it exposes the thought processes or reasoning behind a particular behaviour – why a user clicked the wrong icon. However, it does make the analysis and representation of the data more complex.

Although these are defined, in practice one does not usually start by thinking about the style and typically as you think about the problem and what primary data your research will collect to deal with it then it tends to define itself as predominantly quantitative or qualitative.

7.2 Research Approaches

There are two broad approaches to research, which is always essentially exploratory. In practice you do not decide the approach as such and it will effectively be decided for you when you formulate your research problem and construct your research design. However, we may loosely define:

Deductive – in the sense that we have a theory that we want to prove – in simple terms deduction amounts to a valid argument – that is if its premises are true then the conclusion automatically follows. Typically we form what is known as a null hypothesis. That is we set up our research question in the form that there is no effect of some parameter. For example, I might want to look at the significance of scripting languages on system development time. I could do this by setting up a null hypothesis that says 'I contend that the use of scripting languages have no effect on system development time'.

Inductive – in the sense that one hopes that the theory emerges from the data analysis as we go along. It follows that we don't have a hypothesis we just know that we want to explore a certain domain to see what emerges. For example, I might want to investigate the fact that students are not attending chat sessions but I have no idea why (I don't have a theory) so the whole point of doing the research is to explore the issue implied by the question and hope that something will emerge as I go along. So induction is a kind of grounded argument, the truth of whose individual premises would not *guarantee* the truth of its conclusion, yet one hopes that it would provide some evidence for it.

In short we might say that deduction is an outlook we take when we are sure that we know what the outcome is going to be but Induction is an outlook we take when we can only feel probable about a given outcome.

7.3 Research Outlook

Before we look at the various research methods it is useful just to records that there are two approaches that are available to a researchers.

Hypothesis Driven – this is the classical research paradigm where we have by some means devised a theory or speculation of some kind and the research is then directed at trying to show that the theory or speculation is valid. For example, we might theorise about who buys Gel Pens and then try to show that it is true, or more usefully try to explain in a report why it is true

Data Driven – it often happens that when we embark on research we don't have a hypothesis which we are setting out to test. This is very common today where corporations have vast databases and want to see if there is anything useful in there that might for example lead to competitive advantage. It follows, that in these cases we don't start with a hypothesis but we examine the data sets looking for patterns or outliers or indeed anything that might allows is to formulate a theory of some kind. For example, we might look through millions of sales transactions and then to hypothesise that people who buy Gel Pens all have beards and wear glasses. If this theory is true we can better target our Gel Pen products.

7.4 Which Method to Use?

There are many methods/models that we can use for setting up a research idea, the most common being: case studies, vignettes, action research, experiments, quasi-Experiments, surveys, biographies/histories, grounded theory, ethnography and requirements gathering. It is never easy to decide on a method or perhaps more than one method, but the following may help you to make up your mind. Start by asking what exactly are you trying to do or find out? This will help you decide whether you need a qualitative or quantitative approach. So here are something you might consider:

Choosing a method will depend on many factors such as: context, available literature base, basic research purpose, is the domain changing rapidly, time available, skill available, sampling and other practicalities, access, your personal stylistic inclinations, reason for the study, what kind of outcome you want, cost, quantitative/qualitative, scale, control, sensitivity of the data and so on. Notice these factors are almost all about practical things - the whole point being that a design has to be carried out and that means it has to be practical.

7.5 Research Basic Purpose

In research, usually we try to do one or more of the following: understand something, explore something, describe something, explain something, illustrate something, improve something, build something or prove something. It is therefore very important when you are trying to decide on a method to keep this basic purpose uppermost in your mind.

7.6 Rationale: Case Studies

The case study method focuses on just one, two or twenty examples – such as your place of work, or one element of your organization or several aspects of a problem area. Typically:

1. Case studies are commonly used to **illustrate** or **understand** a problem or **indicate** good practice.
2. Case studies always have a context so make sure you are aware of it.
3. Case studies are usually qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain or describe some activity or phenomena.
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. There are broadly speaking two ways to begin case studies. This first is that you can set criteria and then go looking for relevant cases or secondly you can design and create the cases.
7. For most case studies there is usually be a longitudinal element - that is the cases will run over a fixed time period and you will periodically visit each case to collect the data.
8. There are several kinds of case possible:

Unique – implying that the setting and context are extremely rare and there may no be another chance to study this problem area again.

Critical – implies an important theory that you want to test and a particular case fits that profile.

Representative – implies that the case profile represents a typical or everyday situation.

Revelatory – implies that the case profile allows a researcher to study a situation never before looked at in detail and its context may be come common.

9. In practice you can use the following to organise your cases but remember once you have your case design you will need permission from whoever is necessary.

How many cases – be practical because there are time limits.

Case Criteria - add as many criteria as you think necessary to pin down the data location but don't have so many that you will never find a case that fits.

Sample criteria (collection protocol) – add as many criteria as you need to pin down a particular sample point where a unit of data can be obtained.

Visit Frequency - each case must be visited to get the data so work this out by looking at how much total time is available for the study.

Data collection Vehicle – by observation, interview, document analysis, etc. You will have to have a protocol to say when a valid sample arrives.

7.7 Rationale: Vignettes

These are perhaps best thought of as micro case studies or snapshots that illustrate just one idea and almost always are qualitative in their application. Typically:

1. Vignettes are commonly used in research contexts where actions, motives and judgements are to be explored, often in sensitive situations and you want to extract and **describe** examples or **illustrations** of significant elements in that problem domain
2. Vignettes always have a context so make sure you are aware of it.
3. Vignettes are essentially qualitative in nature.
4. Typically indicated as useful when the research question starts with 'how' or 'why' and there is a desire to explain, test an idea or describe some activity or phenomena.
5. Typically you cannot control and indeed have no desire to control the events being looked at but the events should be contemporary.
6. Vignettes enable participants to define the situation in their own terms or for their needs.
7. Most vignettes are "one off" events and as such act as indicators of an idea rather than as some sort of proof of concept. Therefore, this may also be useful when only a small sample is possible.

7.8 Rationale: Action Research

The main purpose of action research is to improve identified practice in some way. Typically:

1. Action research is commonly used to conduct research at the workplace with a strong desire to **improving** aspects of your own or colleagues' work so
2. In this kind of research you must be in control of events and they must be contemporary.
3. Typically indicated as useful when the research question starts with 'how' and there is a desire to explain something and use that explanation to improve practice.
4. Because of its setting, it is obvious that the research design is linked closely to its context.
5. The whole point of doing action research is the research leads to change in practice.
6. The working strategy is: plan something, do something, observe the something and reflect on what has happened as a result of your actions.

7.9 Rationale: Experiments

This form of research is used where there is a hypothesis and an associated variable that you can control (the independent variable) that will produce a change in some other variable (the dependent variable). That is the whole idea implies that you can intervene by altering or controlling the independent variable. Typically:

1. Experiments are commonly used when you want to **prove** or at least **indicate** that something is true. In practice proof is very difficult as it would imply that your findings are true for everyone, everywhere and for all time and so then tendency is to say indicate rather than prove in most cases.
2. In very simple terms one forms two groups: one which is exposed to the intervention and one which is not and then we observe if there is any difference because of the intervention.
3. Typically indicated when the research question starts with 'how' or 'why'.
4. The researchers must be in control of the events being looked at and they must be contemporary.
5. The biggest risk is that there may be other variables involved which we are not aware of.
6. It is difficult to be sure that our sample is representative.

7.10 Rationale: Quasi-Experiments

This form of research is used where there is a hypothesis and associated variables but you cannot control any of them. It would be nice to think we always had time and resources to run a carefully designed experiment but unfortunately this is often not the case. In an experimental design one chooses the samples involved randomly and thus one has control. However, it may be that data already exists and you can test your theory on that existing data or it may be that you simply cannot get control over all the variables that you want. So an experiment and a quasi-experiment are very similar it's just that the quasi-experiment does not quite have all the trappings that a full experiment has.

7.11 Rationale: Surveys

This form of research is used when we want to ask a group of people a question or questions. Typically:

1. Surveys are commonly used when one needs to get and express an overall **understanding** of the properties in a given domain.
2. One could of course also survey 'things' as well as people.
3. Surveys lend themselves to future replication.
4. Typically indicated when the research question starts with 'who', 'what', 'where', 'how' many' and 'how much'
5. There is no need for you to control the events being looked at but the events should be contemporary.
6. Questions must be well-designed and unbiased and may be asked by interview or questionnaire.
7. Be careful to distinguish questions that are asking for facts and questions that are asking for opinion
8. The results will be very dependant on having a big enough and representative sample.
9. Be clear as to how the data will be collected – by observation, interview, questionnaire, etc. You will have to have a protocol to say when a valid sample arrives.

7.12 Rationale: Biographies/History

This form of research is used when we want to trace an historical event and analyses/evaluate its history as this may lead to insights or explain certain action so that lessons may be learned.

1. Biographies/History are commonly used to form a **description** and **explanation** of events.
2. One can use this to look at individuals or organisations or even technology.
3. Typically indicated when the research question starts with 'what'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. Be clear as to how the data will be collected – by documentary study and interviews are common.
7. Histories are naturally chronological and are characterised by epiphanies (pivotal events) and almost always exists in a context.

7.13 Rationale: Grounded Theory

Here the main idea is to use research to arrive at a theory based (grounded) on collected data. Grounded theory is quite difficult to understand and practice.

1. Grounded theory is used in situation where the theory is unclear or even unknown and so there is a need to **explore** seeking **description** and **explanations** in a domain.
2. One can use this to look at organisations or technology.
3. Typically indicated when the research question starts with 'why'.
4. You cannot control the events being looked at but the events need not be contemporary.
5. This is typically a qualitative study.
6. Be clear as to how the data will be collected – by documentary study, interviews, questionnaires etc.
7. Grounded theory is systematic in that the idea is to gradually move closer to a position where we can suggest a theory or proposition.
8. The basic unit of research is the category which is something that may represent a unit of information and might be almost anything.
9. The essence of grounded theory is in its data processing where various forms of coding are used to gradually unlock meaning in the data.

Open Coding – essentially the formation of the initial categories of information – it is characterised by looking for properties or asking when the something is a dimension of the research space.

Axial Coding – this is about trying to assemble that data after open coding. This can be done by using a diagram or some logic that connects things or looking for causes or looking for contexts and consequences.

Selective Coding – here the researchers invents a plausible storyline that integrates the categories in the axial coding model.

Matrix – a final step (though often omitted) is to produce a conditional matrix that is supposed to make clear the social, historical, technological or economic conditions that prevail in a situation.

Theory – one hopes that as a result of all this processing a theory will emerge which of course may go on to be tested by a formal experiment.

7.14 Rationale: Ethnography

This form of research is used when to immerse ourselves in the day to day life of an organisation or group. In this context ethnography is a description and interpretation of a cultural or social group.

1. Ethnography is commonly used when we want a reflective **description** expressed in an **interpretive** manner.
2. One can use this to look at individuals but more typically organisations.
3. Typically indicated when the research question starts with 'why'.
4. This is typically a qualitative study.
5. You cannot control the events being looked at but the events need not be contemporary.
6. You may alter the events being looked at because you are normally a participant observer.
7. Be clear as to how the data will be collected – by participant observation.
8. Ethnography is about immersion in a culture: behaviours, language, structures and functions.
9. In such studies one often encounters gatekeepers, key informants and communication relies on a sense of reciprocity by investigator and his subjects.

7.15 Rationale: Requirements Gathering

Requirements are simply a statement of a systems service (what it must do) or constraints (what it does not necessarily do). In practice saying what a system must do is often extended to how it will do it. This method is a form of action research but it differs in that the only contact one has with the people involved is at the requirements stage and possibly at the implementation stage though this may vary depending on the systems life cycle employed. You should use this method when you are setting out to build an application of some kind such as a computer application. There are 4 stages of requirements.

Functional Requirements - These are requirements that say what a system does or is expected to do. Typically this would involve or include most of the following: process descriptions, details of all inputs/outputs and details of all the data that must be held in the system.

Performance Requirements - This is usually understood to mean requirements that describe aspects of the system that are concerned with how well it provides the main functional requirements. For example: performance criteria such as response times or how long it takes to print a report, data throughput and storage needs and security considerations.

Technical Requirements - This aspect of requirement looks at the tools and method used to build the system. For example, it may happen that you have to use a certain database package or for other reasons you need to select a particular scripting language and so on. More often than not this aspect amounts to looking at technical constraints that must be applied in building the system.

Usability Requirements - Requirements that ensure that there is a good match between the system and its users. In most cases usability is expressed in terms of measurable objectives.

7.15.1 The Requirements Document

The system and software requirements are usually documented in a formal manner so that ones understanding may be communicated to customers and system builders. The requirement document describes the following:

Services and Function – that the final system must deliver.

Operational Constraints - under which the system must operate.

Development Constraints - on the process used to develop the system.

Properties of the system - in the sense that it may have unplanned additional functionality.

Links - definition of other systems with which the system must integrate.

Domain - Information about the application - for example how to carry out certain tasks.

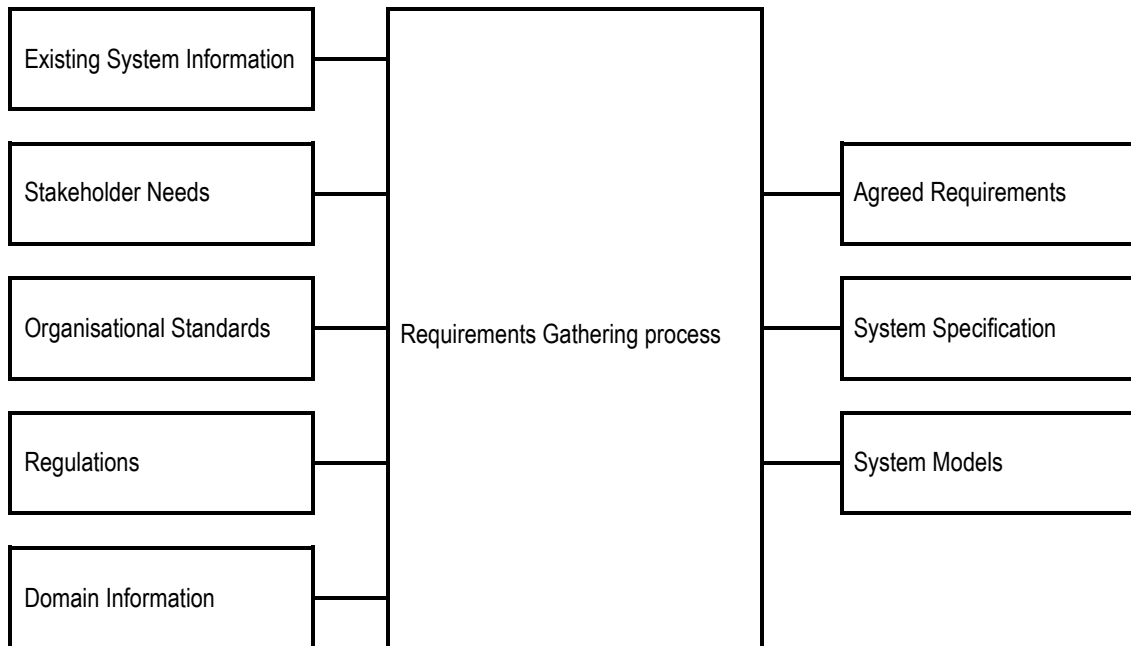
Definitions – acronyms, abbreviations etc.

7.15.2 Stakeholders

These are people who will be affected by the system and therefore should have a direct or indirect influence on the system requirements.

7.15.3 A Process Model

As a process model we might define the requirement process as follows.



7.15.4 Requirement General Questions

There are perhaps four general questions we might ask when attempting to gather requirements

Problem - What are the problems with the current processes?

Improvements - What are the improvement goals?

Reference. Kotonya, G. and Sommerville, I, (1997), Requirement Engineering, Wiley, ISBN 0-471-97208-8. This book is useful because it also contains excellent reading and reference lists.

7.16 Research Design

Finally, you must set out your research design. That is, explain how you will get your data – and this must be done in great detail. In summary, then, your research design is the blueprint of your research project which enables you to deal, systematically, with:

What questions to study?

What data is relevant?

What data to collect – you will need to work very hard here so that you can rely on your data.

Are there any practical limitations to what you can do

How to analyse the results – don't shirk this.

How to decide in which contexts your findings are applicable or can be exploited.

The main purpose of your research design is to help you avoid a situation in which the evidence you eventually collect does not address your initial question.

7.17 Research Process Development

It is quite common is many kinds of research but notably in Case Study and Action Research for the researcher's perceptions to change as data emerges. Often this will imply that the research design has to be changed or amended if it is to remain meaningful. These changes may be small such as a slight modification to the Research Question or aim but occasionally it may be necessary to make significant changes. For this reason researchers must always be careful in their design to allow a little flexibility if they can to accommodate possible unforeseen circumstances.

8. WORKBOOK 8 - BIBLIOGRAPHIC REFERENCING HARVARD APA

This workbook is a short summary of the APA style guidelines as contained in The Publication Manual of the American Psychological Association, 5e, 2001 (Subject Reference Collection: 808.02 AME).

The APA style is based on the Harvard referencing system whereby the date of publication follows the author name(s), and in-text references refer to items in the reference list using the author surname and date of publication, in brackets.

Referencing is important in all academic work as it indicates to the reader the sources of your quotations and borrowed ideas. Failure to indicate your sources is tantamount to plagiarism (literary theft). The purpose of the referencing system is to describe your sources in an accurate and consistent manner and to indicate within the text of your paper where particular sources were used.

Please note that there are two sections to this document:

How to **reference** correctly a source in the **bibliographic** section of your work

How to **cite** correctly a source in the **written** part of your work

Don't Get Caught Out! If you do not reference correctly you may lose marks or your work may be returned unmarked to you for correction. Therefore:

Keep a careful note of all sources used as you prepare your assignments.

Record all the details you need about a library book (including page numbers for any quotations) **before** you return it - someone else may have the book if you try to go back and check later.

Make sure you write down the source details you need on any photocopies or downloads you make.

Remember to print or save details of any website you want to refer to and record the date when you accessed the information.

8.1 Reference list (Bibliography) at end of Project/Dissertation

The reference list should be arranged alphabetically by author surname. The APA format requires book and journal titles etc. to be italicised, although we are not strict about that.

As a rule in projects and dissertations it is normal to produce two lists. The first is a reference list and that **MUST** only include sources you have cited. The second is a bibliographic list which includes all other sources you might have found but did not cite – this list is to allow the reader to explore the topic further if they wish.

8.2 Books

The details needed for a book can normally be found on the front and back of the title page. Make sure you locate the name of the publisher rather than the printer or typesetter. You need the name of the publisher in your reference list. Ignore any reprint dates; you need the date when the first, second, third edition etc. of the book was published according to which edition of the book you are using.

8.3 Journal articles

The details needed for a journal article can usually be found on the contents list, front cover or article itself.

8.4 Printed publications: Examples of References

The following are sample if how to correctly reference a source.

Book – pattern: Author, Initials. (year). Title of book. Place of publication: Publisher.

American Psychological Association. (1994). Publication manual of the American Psychological Association 4e. Washington, D.C.: Author.

Encyclopedia of psychology. (1976). London: Routledge.

Gardner, H. (1973). The arts and human development. New York: Wiley.

Moore, M. H., Estrich, S., McGillis, D., & Spelman, W. (1984). *Dangerous offenders: the elusive target of justice*. Cambridge: Harvard University Press.

Strunk, W., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

Note: Only list up to 6 authors. The 7th and subsequent authors are abbreviated to et al.

Edited book

Maher, B. A. (Ed.). (1964-1972). *Progress in experimental personality research* (6 vols.). New York: Academic Press

Article in edited book (Chapter) - The basic pattern for a reference to a chapter in an edited book (where the chapters have been written by several different people) is:

Author of chapter, Initials. (year). Title of chapter. In Initials. Name of Editor/s (Ed.) *Title of book* (pp.start and end page numbers of chapter). Place of publication: Publisher.

Vygotsky, L. S. (1991). Genesis of the higher mental functions. In P. Light, S. Sheldon, & M. Woodhead (Eds.), *Learning to think* (pp. 32-41). London: Routledge.

Encyclopedia entry - If the entry has no author, begin the reference with the entry title followed by the date of publication.

Lijphart, A. (1995). Electoral systems. In *The encyclopaedia of democracy* (Vol. 2, pp. 412-422). London: Routledge.

Government publication

Great Britain. Command Papers. (1991). *Health of the nation* (Cm 1523). London: HMSO.
Great Britain. Home Office. (1994). *Prisons policy for England and Wales*. London: HMSO.

Report

Birney, A. J., & Hall, M. M. (1981). *Early identification of children with written language difficulties* (Report No. 81-502). Washington DC: National Educational Association.

Conference paper in published proceedings

Borgman, C. L., Bower, J., & Krieger, D. (1989). From hands-on science to hands-on information retrieval. In J. Katzer, & G. B. Newby (Eds.), *Proceedings of the 52nd ASIS annual meeting: Vol. 26. Managing information and technology* (pp. 96-100). Medford, NJ: Learned Information.

Journal article - The basic pattern for a reference to a journal article is:

Author, Initials. (year) Title of article. *Title of journal*, Volume number - if there is one (Issue number), start and end page numbers of article.

Noguchi, T., Kitawaki, J., Tamura, T., Kim, T., Kanno, H., Yamamoto, T., et al. H. (1993). Relationship between aromatase activity and steroid receptor levels in ovarian tumors from postmenopausal women. *Journal of Steroid Biochemistry and Molecular Biology*, 44(4-6), 657-660.

Popper, S. E., & McCloskey, K. (1993). Individual differences and subgroups within populations: the shopping bag approach. *Aviation Space and Environmental Medicine*, 64(1), 74-77.

Weekly magazine article

Barrett, L. (2001, August 23). Daewoo's drive to survive in the UK. *Marketing Week*, 22-23.

Newspaper article

Caffeine linked to mental illness. (1991, July 13). *New York Times*, pp. B13, B15.
Young, H. (1996, July 25). Battle of snakes and ladders. *The Guardian*, p. 15.

Two or more works by the same author(s) with the same publication date - Where an author (or particular group of authors) has more than one work in a particular year, list them in title order and follow the date with a lower case letter a, b, c, ... For example:

Harding, S. (1986a). The instability of the analytical categories of feminist theory. *Signs*, 11(4), 645-64.
Harding, S. (1986b). *The science question in feminism*. Ithaca: Cornell University Press.

Anonymous works - If a work is signed "Anonymous", your reference must begin with the word Anonymous, followed by date etc. as normal. If no author is shown, put the title in the normal author position.

Note on source page numbers - Use pp. for page range only for encyclopedia entries, multi-page newspaper articles and chapters or articles in edited books. For articles in journals or magazines use the numbers alone.

Interviews and email messages - Because interviews and email messages are not considered recoverable data, you do not give details in your reference list. You should, however, cite an interview or email message within the body of your text as a personal communication: ...and this point was conceded (J. Bloggs, personal communication, August 22, 2001)

Legal References - Because the situation regarding legal references is complex and only US law is covered in the APA Manual, legal references will be covered in a separate guide.

Audiovisual sources: examples of references - Such sources are often complex but please note.

Films - The basic pattern for a reference to a film is:

Name of primary contributor - the director or producer, or both, Initials. (Role of primary contributor). (year). *Title of film* [Motion picture]. Country of origin - where the film was primarily made and released: Name of studio.

Reed, C. (Director). (1949). *The Third Man* [Motion picture]. United Kingdom: British Lion/London Films.

Spielberg, S. (Director). (1993). *Jurassic Park* [Motion picture]. United States: Universal Pictures/Amblin Entertainment.

If the film doesn't appear on the Library Catalogue, the Internet Movie Database <http://uk.imdb.com/> is a good place to check all the details needed for a film reference (follow the Company credits link to find details about the film studio/s involved). Alternatively, check Halliwell's Film and Video Guide.

Review of a film - If the review is untitled, put everything in square brackets in the normal title position and keep the square brackets.

Kinder, M. (2002). Moulin Rouge [Review of the motion picture *Moulin Rouge*]. *Film Quarterly*, 55(3), 52-59.

Malausa, V. (2001). Beauté du mensonge [Review of the motion picture *The Tailor of Panama*]. *Cahiers du Cinéma*, 558, 82-83.

Television programmes

Collinson-Jones, C. (Producer), & Dobson, E. (Director). (2003, July 14). Casualties of peace [Television broadcast]. London: Channel 4.

Single episode from a television series

This example shows the most complete information possible for a television episode. If details of the writer are unavailable, begin your reference with the name of the director.

Fraser, R. (Writer), & Geoghegan, S. (Director). (2003). Eyes wide open [Television series episode]. In P. Goodman (Producer), *Holby City*. London: BBC1.

Radio programmes

Portenier, G. (Producer). (2003, July 17). *Crossing continents*. London: BBC Radio 4.

Electronic sources: examples of references - The details shown below have been compiled according to the guidelines available on the APA Website (<http://www.apastyle.org>) in August/September 2001 (re-checked July 2003). Check this Website and the 5th edition of *The Publication Manual of the American Psychological Association* which is available in the Frewen Library for further guidance.

The basic pattern for a reference to an electronic source is:

Author, Initials. (year). *Title*. Retrieved month, day, year, from Internet address.
Banks, I. (n.d.). *The NHS Direct healthcare guide*. Retrieved August 29, 2001, from <http://www.healthcareguide.nhsdirect.nhs.uk/>

If no date is shown on the document, use n.d.

If the author is not given, begin your reference with the title of the document.

If a document is part of a large site such as that for a university or government department, give the name of the parent organisation and the relevant department before the Web address:

Alexander, J., & Tate, M. A. (2001). *Evaluating web resources*. Retrieved August 21, 2001, from Widener University, Wolfgram Memorial Library Web site: <http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm>

Deciding your future. (2000). Retrieved September 5, 2001, from University of Portsmouth, Careers Service Web site: <http://www.port.ac.uk/departments/careers/plancareer/deciding-your-future.htm>

Electronic journal articles which are duplicates of the printed version - Use the same reference format as for a printed journal article but add "Electronic version" in square brackets after the article title:

Lussier, R. N., & Pfeifer, S. (2001). A crossnational prediction model for business success [Electronic version]. *Journal of Common Market Studies*, 39(3), 228-239.

If you are referencing an online article where the format differs from the printed version or which includes additional data or commentaries, you should add the date you retrieved the document and the Web address (URL).

Articles in Internet-only journals

Korda, L. (2001, July). The making of a translator. *Translation Journal*, 5(3). Retrieved August 21, 2001 from <http://accurapid.com/journal/17prof.htm>

Use the complete publication date shown on the article.

Note that page numbers are not given.

Whenever possible, the URL you give should link directly to the article itself.

Break a URL that goes onto another line after a slash or before a full-stop. Do not insert a hyphen at the break.

Articles retrieved from a database - Use the format appropriate to the type of work retrieved and add a retrieval date, plus the name of the database:

McVeigh, T. (2000, July 9). How your gestures can do the talking. *The Observer*, p.7. Retrieved September 10, 2001, from The Guardian and The Observer on CD-ROM database.

8.5 Citing references in the text

There are basically two forms. The first is when the author's name is naturally part of the sentence and the second when it is just a reference. References are made from the text of the paper to the full details of the work in the reference list in the following manner:

It is a contention of the paper, and this contention is supported by Williams (1995, p.45) who compared personality disorders ...

When an author, or group of authors, has more than one publication in the same year a lower case letter is added to the date. For example:

In two recent works Harding (1986a, p.80; 1986b, p.138) has suggested that ...

With two authors both names should be listed in each citation e.g. Duncan & Goddard, (2003, p.99)

With three to five authors name all authors the first time, then use et al. (and others). For example: the first time it would be Moore, Estrich, McGillis & Spelman (1984, p.33) and subsequent references to the same publication would use Moore et al.

For six or more authors, use et al. after the first author in all occurrences.

Note that when the in-text reference occurs naturally within the sentence "and" should be used before the final author.

When a source has no author, cite the first two or three words of the title followed by the year. For example:

... in the recent book (*Encyclopaedia of psychology*, 1991, p.62) ...

... in this article ("Individual differences," 1993, p.12) ...

Web pages where no author is given

However, if the author is designated as "Anonymous", cite the word Anonymous in your text e.g. (Anonymous, 1993, p.116).

When using quotations in your text

Try to observe the following methods.

Gardner (1973, p41) stated that, "The relative importance of the systems may nevertheless remain in approximately the same proportion"

Smith (1991, p84) found that "...there is no evidence that chimpanzees can produce a drawing and discern the object represented in it..."

Occasionally, very occasionally you may need to cite a work that you discovered in another work because you cannot find the source then observe the following examples:

Smith (1970, p.27) cites Brown (1967) as finding ...

Brown (1967), cited by Smith (1970, p.27), found ...

It was found (Brown, 1967, cited by Smith, 1970, p.27) that ...

If you need to use this form your tutors must approve it and you must show that you have made every effort to track down the primary source.

9. WORKBOOK 9 – WRITING UP A RESEARCH PROJECT

This document is in several sections covering everything from project supervision to grading.

9.1 Your and Your Supervisor

The student supervisor relationship is very important if a high quality project is to be the outcome. As a rule the supervisor will be interested in the topic area and will want to be active in its development although you as a student must do the work. However, your supervisor will not be expert in everything but will usually have some knowledge of simple statistics and the four main research methods: experiments, action research, surveys, case studies and application development.

9.1.1 Student Expectations

The normal expectation is that students have of their supervisor are as follows:

- Only be available for consultation for a limited time.
- Only supervise what the student does and not do the work for them.
- Advise on research design, scheduling and literature surveys.
- Advise on theoretical, conceptual and methodological issues.
- Advise on development of research skills.
- Advise on data collection, processing and analysis.
- Advise on ethical issues if they are relevant.
- Read, evaluate and be constructively critical of student work if given sufficient time.
- Have a good knowledge of the general area you are working in.
- Be in contact with the student regularly.
- Arrange if necessary supervision chat sessions.

For project students on distance learning programmes it will be possible to have meetings in the WebCT chat room, using IM or Skype where a full and detailed interaction can take place. These must be agreed with your supervisor and must be planned not to clash with other classes. However, some tutor may allow student to contact them any time they are seen to be online.

9.1.2 Departmental Expectations

Supervisors take a formal role and certain attitudes and actions are expected. In general they will:

- Visit the discussion board and email regularly within WebCT (at least 3 times per week).
- Set a mail forwarding address to their personal accounts in WebCT email settings.
- Devote at least 6 hours to the supervision process spread over the project duration.
- Conduct one-to-one chats as required with project students.
- Conduct student/supervisor communication within WebCT or their personal email account.
- Respond to a student query within a certain time frame (normally no longer than 3 days).
- Be familiar with all the project guidance notes and workbooks.
- Be familiar with the project chapter profiles.
- Make sure students know if they are to be away for an extended period.
- Be aware that students may make contact though any one of their three WebCT accounts.

The essence of online supervision adequacy is based on the quality of communication between supervisor and student with the intent that we want the learning experiences to be exiting, stimulating and self-rewarding. In practice this means that communication must be frequent, lucid, critical and yet encouraging.

Supervisors should be aware that if they set email forwarding in WebCT they will effectively get an automatic alert when there is mail for them. If the student has also set mail forwarding then supervisors will be able to reply immediately otherwise they will have to go into WebCT. However, there is no alerting mechanism if a student posts a question into discussion so supervisors must visit the site from time to time so as not to miss any messages.

9.1.3 Supervisor Work Reviews

Supervisors will read your written work. However, when they do this certain rules apply:

Finished work – you should supply your supervisor with written work as it is produced chapter by chapter but it must be finished work. In this context finished work means that the format and content are the very best you can produce and in accordance to the guidelines found in this workbook. The tutor's role is not to act as some kind of filter for rough work or polishing multiple drafts which you want to improve in effect making them do the work for you. If a tutor suspects that the section you have sent in is not in its final form they will return it to you without comment.

Action on Feedback – if you are given feedback on any part of your work then you are expected to study it with care and commitment. However, it is up to you how to respond or even ignore what you are told but in all cases the consequences that follow are entirely your own responsibility.

Responding to Feedback – in all cases you are expected to respond to feedback. This may take several forms: writing to your supervisor saying that you don't agree with him or perhaps offering further explanation or as in most cases making changes to the content or structure of your project document. When you make document changes in response to feedback they are to be shown **shaded** so your supervisor can easily see exactly what you have added or amended.

Questions to Tutor - your tutor will not answer any questions regarding whether your work is right, wrong, is it a pass, what mark will I get or is it good enough. The only thing you can expect in this area is that you tutor may advise you that the work is not ready for submission to the university. If this happens it will be entirely your own decision whether to submit or not.

Response from Tutor - in most cases you supervisor will only suggest that you do something or ask a question designed to point you in a new direction. Normally, the tutor will not supply you with any project content since that must be provided entirely by you. The reason is that the work is yours not the supervisors.

Preparation - Your supervisor will expect you to be familiar with all the notes and workbooks contents. You should therefore be careful that you don't waste supervision time asking questions to which you already have the answers.

9.1.4 Chat Session

Chat sessions for project students will usually be one-to-one and are typically used when there are particularly awkward difficulties – chat will NOT be the norm during projects and your tutor will have no expectation that chat will be used.

9.2 Overview of Project Structure

Here are some general guidance notes – they are NOT suggested chapters but general content guidance on the project as a whole and have a sharp process focus.

9.2.1 Introduction summary

This is about the problem theme and its setting, client context, topic area, personal theory, Research Question or application functional description and intended project outcome, general research orientation followed by a well-define aim and sound set of objectives. The introduction is to be precise, concise taking a discussion form that is explanatory and focused on giving readers a clear, coherent and comprehensive view of what the project is about.

9.2.2 Preparation for Research

This is your study of the topic area and research methods that you will need to know about. You will have to justify and explain the methods you intend to use; it is also your study of other people's work in the area that you wish to investigate - and a description of how you learned from their research.

Literature Review - What has been done before in this area - related to a particular problem theme and Research Question. This is all about preparing ones mind with all the topic area and research knowledge you will need.

Research Review - research into how the project investigation could be done and supported. At this stage student will already have an outline plan based on their approve specification but now the whole design must be thoroughly reviewed before actual work begins.

Knowledge of Alternatives – build a simple decision base which allows one to consider which methods could be used and how could they be used for this project.

Choices Made - which methods are to be used and rationally consider why they are good enough for the purpose.

9.2.3 Core Research

Here you execute the refined research design translated into a practical plan to obtain the collection of primary data and process it using acceptable methods into the intended project outcome.

9.2.4 Evaluation and Conclusions

This is the stage that looks at how one finishes off a project by a process of evaluation and the drawing of conclusions. In particular, it is needful to look at how one evaluates what was done and how it was done – that one needs to consider the project product (or outcome) and the project practice. For our purposes evaluating will be taken to mean reflecting on product and practice.

Many students confuse evaluation and conclusions but for a full consideration of the research work one must look at all project specific results and outcomes as well as practices and evaluate them and then perform the more difficult step of drawing generalised conclusion about both product and practice.

Evaluation of Project Product – the project outcome or product is normally evaluated against objectives, other existing products, using defined criteria or some form of expert evaluation. Additionally, one needs to be aware of any constraints that might have an impact on the applicability of the outcome

Evaluation of Project Practice - evaluation of project practice is more difficult than evaluation of project product and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way'. Additionally, one needs to be aware of any constraints involved, including time management that might have impacted on the use of best possible practices.

Conclusions - need to be considered thoughtfully as this is the point where one looks for implications and meaning that arise out of an attempt to generalise the findings.

9.3 Writing up your Project

The following sections describe elements that occur in almost all projects and which are generally important in constructing scholarly work. Do not be tempted to ignore these instructions – anyone who departs from the spirit of them may have their work returned for correction prior to formal marking.

9.3.1 Main Project Body Page Layout

The following example shows how each page of a project report should look, note that each chapter should start on a new page and that it is NOT necessary to actually say Chapter 1, Chapter 2 and so on as it is the heading that is important. Do not use numbering to greater than to three levels but you may use indented (but not bulleted ones) entries within a section at any level.

1. QUALITY CONTROL IN PROGRAM DEVELOPMENT

In this chapter the nature of quality will be discussed and its relation to physical measurable properties that might characterise quality.

1.1 INTRODUCTION

This project discusses a possible strategy for devising a program development methodology that goes some way to guaranteeing the qualities of the delivered system. In particular it will concentrate on just two aspects - that of developing generic designs and code and how such designs could be assessed for quality and function. The strategy is based on the simple premise as endorsed by leading authors in the field such as Blenkinsop, Wilson and Bowers that categories of problem can be identified and formalised. It is the contention of this report that such a process would more or less automatically:

Reduce - the complexity of the design process itself.

Ensure - the quality of the final product by:

Giving managers more control over the product development cycle.

Giving users more idea of the kind of system they are likely to get and much more say in what the shape of the product will finally be.

Releasing programmers from the drudgery of having to design the same piece of code over and over again, thus enabling them to concentrate their efforts on new

Formatting Note – you are encouraged to use these two forms of indenting: one with a heading in bold and one without as a means of structuring and indented section. The use of bulleted indents is not recommended anywhere in a project document.

1.2. Multiplicity of Design Factors

Every programmer has had the difficult experience of having to read and understand programs written by someone other than himself or herself. The sort of problem encountered may be aptly expressed in the following lines.

Everything has been thought of before, but the problem is to think of it again. (Goethe)

Many other authors, notably Frewin (1989) have discussed the notion of 'quality model ratios' and in essence this idea means that software systems have an implied model which can be accessed for

1.2.1 Multi-Tier Systems

In modern client sever systems

1.2.2 Interface Facades

In this case we look closely at the Internetetc

9.3.2 Plagiarism Checking

A software tool will check all your sources automatically and if plagiarism is suggested it will be dealt with very seriously since the reputation of the whole course and of the University is at stake. You must remember, that copying, paraphrasing, summarising and similar techniques where the material is extracted from a source must be properly acknowledged.

A simple rule is that if you use more than 6 consecutive words from a source it must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

9.3.3 Writing Abstracts and Identifying Keywords

The function of an abstract is to summarise your project, its context and its conclusions in order to give the reader an overview of the main project theme so that they can make an informed decision on whether they want to read the entire report. A good basic structure might be defined as follows but it will usually be limited to around 300 words.

What was the project about?

What did you actually do?

What were the conclusions?

It is normal to add keywords or phrases after the abstract to act as specific pointers to content. There are no particular rules about how to construct these words or indeed how many there should be but typically there are 5 or 6 and to be useful they must be chosen with care in the sense that they might in themselves be regarded as a sort of abstract of ones work.

9.3.4 Standard Appendices

Project reports MUST include the following appendices:

Your Project specification – it may be brought up to date from that submitted at the start

Your project plan expressed in an appropriate format

A glossary if this is appropriate

A full reference list of work that you cited

A bibliography (may be combined with your citation list)

Each Appendix should be introduced by a title where the number (12 in this case) should follow on from the numbering within the body of the report: **12. Appendix A – Project Specification.**

9.3.5 Typical Project Organisation

Below is a suggested organisation for your complete project.

Briefing Pages

Heading pages (examples follow later in the section)

Plagiarism declaration

Abstract for Report including keywords

Acknowledgements

Dedications

Content list (automatically generated) for all headings, tables and figures/graphs etc

Introduction:

Brief topic area outline and background to problem
Presenting Problem definition
Real World Target relevant to the problem
Speculation of problem causes and possible solution routes
Personal Theory on the best solution route
Research Question/Application Description
Discussion of expected project outcome
Scope of work
Aim & Objectives

Literature Research (see Workbook 5 for recommendation for various project styles)
Detailed consideration of elements that help you focus on your topic area

Research Design

Research Method and its rationale in dealing with the research question/application
Process to collect Primary Data
Processing of the Primary Data to get an outcome

Application Testing (Engineering project only)

Design of Tests
Test Results and conclusions to be drawn from testing.
Implementation plans

Results Discussion and Presentation (study projects only)

Discussion and presentation of results
Generation of intended project outcome

Evaluation (these are specific to what you did)

Detailed evaluation of what was actually done – your practice
Detailed evaluation of your project product/outcome including objectives not met
Met/Not met objectives

Conclusions (here one tries to generalise what was done)

Generalisations based on a consideration of both product and practice
It is also possible to examine the following minor conclusion elements

- Usefulness of literature sources
- Future work/development
- Relevant aspect of the course used during the project period
- Changes one would make if project were repeated
- What you have learned
- Value-added features

References and bibliography (see workbook 5)**Content of Appendices**

The following items must be in a set of Appendices. These may be bound separately if the composite document becomes too large (more than 100 pages).

- Code listings
- Project Specification and project schedule
- Inclusions (copies of relevant documents such as policies, invoice layouts, diagrams etc)
- Questionnaires.
- Summary interview transcripts
- Details test plans
- Requirement catalogues
- Glossary
- Other

9.3.6 Project Types Sample Outline Contents

Broadly speaking there are two kinds of project: engineering where you build an application of some kind and study based where one would investigate in depth some idea. Here are some sample contents lists that show chapter or section headings for the different project styles. However, if it is obvious that these samples have just been copied into your project with minor changes then your work will be rejected. See Workbook 9 section 9.3.5 for further general details.

Sample Study Style Report Contents	Sample Engineering Report Contents
Title: Internet Marketing – A Users View	Title: BrokerBase – Insurance Sellers Information System
Chapter 1. Introduction to Internet Marketing	Chapter 1. Introduction to System
Introduction and contextualisation IT marketing problem theme Problem Theme and target Speculation and Personal Theory Discussion and Exploration of Research Question Project aim and objectives	Introduction and Situation Overview Situation based Presenting Problem Application background and context Application overview Project aim and objectives
Chapter 2. Literature Review	Chapter 2. Literature Review and Application Scenario
Introduction to Internet Marketing Marketing Planning eCommerce Technologies and Tools Costs and Benefit Estimation Consumer Orientation and Market led operations IT supported Marketing and selling techniques Product, Price, Place, Promotion and Customer expectation IT supported Experiential marketing Security protocols and languages Auditing and secure payment systems	Outline of Insurance Brokerage practice Background Review of the Application Scenario Outline of Application Build Process and Tools
Chapter 3. Research Design	Chapter 3. Requirements Specification
Research Method Selection and Rationale Primary data collection process Data specification Data locations and expectations Collection Protocol Processing of Primary Data Collection Outline Results Project Outcome	Outline of the requirements (requirement catalogue into appendix) Research Plan for requirement gathering: functional, performance, technical and usability Outline Requirements catalogue Analysis and Evaluation of requirements
Chapter 4. Evaluation (Project Specific)	Chapter 4. System or Application Design
Evaluation of Project Outcome Evaluation of Research Methods and Protocols used	Principles used for this design Overall system design Build Process Overview Database design Component design Interface design including website
Chapter 5. Conclusions (Project Generalisations)	Chapter 5. System Implementation and Testing
Generalisations on the research Outcome Reflections on what was learned etc	Testing strategy Testing plans (detailed plan placed in appendices) Test results (detailed report placed in appendices) Application Implementation plans
	Chapter 6. Evaluation
	Evaluation of the application Evaluation of practice (methods and tools used)
	Chapter 7. Conclusions
	Generalisations based on the Application Reflections on what was learned Future work Etc
Notes	
1. Whatever the project styles the appendix must include: the project specification, glossaries, references lists, bibliographies. The appendices may be attached to the main report or they may be placed in a separate document.	
2. Remember these are just samples and you may well have different numbers of chapters and different heading and sub-headings	
Table 6. Sample Project Content Outlines	

9.4 Report Writing

In your research you will often have to write reports and of course you will have your final report to write. Reports are a special form of writing and therefore you need to note that reports are:

- Written for defined purpose.
- Written and targeted at specific audience.
- Written systematically to present your findings.
- Focused on what you have done.
- Information structured and formatted to lead reader quickly to main themes and findings

9.4.1 Structural Elements

The following tables are intended to give you some guidance on how to construct report in a scholarly fashion and in a way that leads to clear and concise presentation. It is important to structure all your work in a way that enhances its usefulness and utility. The following is a list of all the major structural elements, though there is no need to use all of them in every document you produce. The best advice is to choose a structure and then those elements that best suit the work in hand.

Structure	Description	Location
Title	A focused and short description of the document that summarises the deliverable element	Front page and above the contents list
Contents List	A short index based on the major chapters and/or sections	Before the main document begins but after the title page
Glossary	Used to list and describe special terms or abbreviations	Towards the end of the main document
Index	A detailed listing of all important words or phrases specifying location in main text	After the glossary if it exists otherwise after the main document
Appendix	For inclusion of explanatory notes, special documents or copies of originals	After the glossary but before the index
Footnotes	Notes at the bottom of pages and linked to pieces of text.	Immediately before the page footers
Headers	Standard text	Every page
Footers	Standard text	Every page
Keywords	Words or phrases used to form a simple classification of your work	Near front of report
References	List of all reference material in an approved manner	Toward end of document

Table 7. Main Document Physical Structural Entities

Organisation	Description
Chapters	Major elements in the development of the subject matter of the document
Sections	Minor elements in development of each chapter
Headings	Major Information Content indicators
Indents	Used to emphasise small but important points in the text
Bullets	Used to further emphasise an indented text
Tables	Used to represent important information concisely
Paragraph numbers	Used when it is necessary to reference all parts of a text
Page numbers	Used for indexing purposes
Diagrams	Used to show idea or data pictorially
Captions/Legends	Added to diagrams where necessary
Columns	Use when the subject material lends itself to such a view

Table 8. Main Document Structural Devices

Presentation	Description	Examples
Font	Letter style and size	May be proportional or fixed point
Renditions	Printed form of font	Bold, underline, italic, reversed
Orientation	Page format	Portrait or landscape
Form	Delivery form	Paper, electronic
Table 9. Main Document Structural Properties		

9.4.2 Report Writing Stages

There are a number of stages to writing a report and they require you to be focused on what you are trying to show as the core of your report.

What are your trying to show – this really goes along with the underlying purpose of your research question – typically this will be about wanting: to inform, to explain, to evaluate, to prove, to advise, to recommend, to predict or to bring about changes.

Collect and sift material – it is important to jot down ideas relevant to your purpose. These jottings will help you form an action plan for gathering information from other documents, visits, interviews, observation, surveys etc.

Note - information sources as you find them

Organise and structure the material - group your work into chapters, sections and sub sections. Make sure the order is logical.

Draft and edit/redraft – to get a good report you may well have to re-write it several times and this may include complete re-ordering. It is important that you need to be concise and use a formal language but it must be clear and concise. Use simple, straightforward words and sentence construction and make sure your spelling and grammar are faultless. Use clear headings and sub headings with bulleted indentations.

Thematic – make sure your work has clear themes that are easy to follow.

Plain English - do not try to be over-clever or fall into jargon.

Read Saunders chapter 13 pages 414 to 443. Don't skimp on this or I might skimp when I mark inferior work!

9.5 Summary and Advice

Your final project must have a strategic dimension. This does not mean you can't build some software but if you do it will be in support of a strategic objective. So whatever you decide to do consider:

Why it is being done but note it will not be sufficient to just say why, you will have to show evidence for your conclusion.

Cost/benefit is a useful idea but in most cases it is very hard to show benefits. In any case you need to look at other possible ways of showing that something is worth doing.

Don't forget life cycle logistics - that is what are the costs per hour (for example) of running a system for say a 10-year life.

Also look for impact for what you do. For example something might be cost effective but may have a negative affect on some business element.

Think through your ideas; don't be narrow - question everything.

Traditionally strategies are developed around two themes: needs - what are the business needs (at a high level) and what are the business values (what does it regard as important)

9.6 Project Submission Regulations

Successful project reports may lodged in the University library, it is therefore important that reports follow a standard binding format as described below. Project reports that deviate from these regulations may be penalised and returned to you for correction and in extreme cases, failed.

Submission - two full bound A4 portrait orientation copies of your report must be submitted by the defined dates. The report may NOT be submitted electronically – the copies must be sent by courier to reach us by the defined dates. However, you must also submit soft copies on either floppy disc or CD/DVD.

Presentation and Submission Checklist – your project report submitted using the correct form shown in Workbook 10. The form must be bound into your project.

Report Length - the maximum permitted report length is 15,000 words, which usually translates into around 50 to 100 pages (excluding appendices). If your report is likely to be significantly longer than this, consult your supervisor as to what to include and what to exclude. You are warned that should you exceed the permitted maximum length the University may return your work unmarked.

Binding - the project and any separate appendices should be securely bound using tape or book binding - if that is not available then plastic ring binding may be used. No other form of binding is permitted. Binding covers should be a card of weight of 140 gsm and the normal colour is to be RED but any other colour may used in case of sourcing difficulties

Front Covers Format - the front cover appropriately spaced vertically should conform to the pattern shown below using 24-point Arial Narrow with centred text and bold as shown. Do not include the square brackets when you complete these formats as they are just placeholders

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [Name of supervisor]

Project unit Code [Project unit code]
[Month and Year, e.g. September 2004]

Title Page - the first project contents page, appropriately space vertically must contain the following information in the order shown below using 12 point Arial Narrow/Time Roman type throughout. Do not include the square brackets when you complete these formats as they are just placeholders.

University of Portsmouth

Technology Extended Campus

Master's project undertaken in partial fulfilment of the requirements for the

MSc [Degree title]

[Title of project]

by

[Full name of student]

[HEMIS No.]

Supervisor: [*Name of supervisor*]

Project unit: [*Project unit code*]

[Month and Year, e.g. September 2001]

Abstract - [The abstract of the project should be between 150 and 300 words in length and constructed to say what the project was about, what you did and what were the conclusions]

Keyword List - [List of appropriate key words]

Acknowledgements Page - it is common practice to add a page listing those you wish to thank for their help and assistance. As a rule acknowledgements should **only** be given to people who helped you directly with your work but were not involved in it. For example, if a colleague supplied you with a statistical analysis they should be acknowledged. However, it is not usual, necessary or desirable to acknowledge your parents, your friends or your supervisor.

Submission Form and Plagiarism Declaration

You must add the following two pages which require a signature. In practice one adds the signature to the final bound copies.

Declaration of presentation Standards

Include at this point a completed copy of the project submission page shown in workbook 10. Be warned, that if you tick this page and the relevant element is not found to be present, the work will be returned to you unmarked for correction.

Plagiarism Declaration

I confirm that the enclosed written work (including application code) is entirely my own except where explicitly stated otherwise. I declare that wherever I used copying, paraphrasing, summarisations or other appropriate mechanism related to the use of another author's work it has been properly acknowledged in accordance with normal scholarly conventions. I understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as proof of plagiarism.

Signed _____ Date _____

Contents list, Table List and Diagram List

Include as appropriate

9.7 General Grade Criteria

Workbook 14 gives general guidance as to how projects will be assessed. Workbook 14 also contains a table of the criteria used, although the emphasis given to various aspects may vary depending upon the nature of the work and should be explained to students in assessment specific criteria.

9.8 Project Examination Board Reflections

This is a discussion based on observations made on the marking forms and in the Examination Board regarding the quality of the submitted document as final Master's projects/dissertations. Most of these faults are due to shallow and sometimes very shallow thinking on the part of the project student and that is unacceptable at Master's level. The following points are to help both supervisors and students avoid known pitfalls and so produce a project document to a high standard.

9.8.1 Project Introduction – Study Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem definition – common deficiencies were no discussion or poor discussion of what problem was being addressed by the project. Without such a discussion it is almost impossible for a reader to get any grasp of what the project is about. In projects we want to see just ONE major problem theme not several so it often requires clear thinking to set it at the right level. (See workbook 6 section 6.2 and 6.5)

Target and Outcome – there is often considerable confusion over these two ideas. The target is about what might happen in the real world based on the project outcome but often students cannot distinguish what the project will generate and what might be done with that project outcome. As a simple example, students might say that the project outcome is "improved accuracy in data entry" when what they mean one supposes is that in their project they will design (say) a new training programme that will be used to get the real work target of improved accuracy.

Speculation and Personal Theory – students are encouraged to speculate about problem causes and solution routes to arrive at a personal theory about the problem theme and how it might best be resolved leading to a suggestion of an expected form project outcome. A reader expects to see some indication as to what form the project outcome will take and in addition some discussion of the form to at least show that it is likely to go some way to resolving the stated problem theme. Unfortunately, the form was often missing and even when the Research Design was consulted a typical reader could still not see what the project outcome was supposed to be. Here we want to see ONE major form outcome for each project. (See workbook 6 section 6.5).

Research Question - either missing, badly worded or multiple questions offered (sometimes all in one sentence). One common mistake was to ask a question in the form (or some equivalent) of "is it possible...." - the point is that in such questions the answer is almost always that it is possible so the research effort becomes pointless. (See workbook 6 section 6.7 and 6.9)

Process for Generating Primary Data - this is a key element in any project as it is essentially the main activity used to unlock the primary data. It is useful to discuss this process briefly in the introduction since that allows readers to link the problem theme and therefore see what data you are likely to be looking for.

9.8.2 Project Introduction – Engineering Projects

There have been many examples of very poor introductory chapters and in some cases it has led to failure. The main reasons are omission, or very inferior expressions of:

Problem Theme - there was either no discussion or poor discussion of what problem theme the application being built was supposed to resolve. When this happens it is almost impossible for a reader to get any grasp of what the project is really about. (See workbook 6 section 6.2 and 6.5)

Functional Description - many students could not provide a short functional description of the application they were going to build. The most common thing for students to do instead was to provide an overview of the application architecture. This is hopeless as architecturally almost all Engineering projects are the same in that they typically have a database and a webpage for example. This implies that students cannot or do not want to make a distinction between how an application is built and what its purpose is.

9.8.3 Aim and Objectives

In many cases these elements were missing altogether. In other cases one could barely link the aim to the Research Question or application description. However, of most concern was an apparent inability in many students to write a coherent and reasonable set of objectives. Not to be able to write an aim and more particularly objective is representative of a gross error and it should never occur in Master's level work.

Aim - usually composed in a reasonable way but there does seem to be an inclination in some students to cram everything into the aim as if they are some kind of superman. The recommendation is to have just ONE clear activity mentioned in the aim and that should be accompanied by a just one clear outcome for the aim. (See workbook 6 section 6.11, 6.11.1)

Number of Objectives - often there were far too many to be in any way practical for one student in the time available and often this was because they were all expressed at different levels of project resolution.

No Visible Outcome - there were many, many cases where the objectives had no visible outcome. Far too often we got phrases such as: "To understand...." or "To analyse...." without any object to the sentence so there was no outcome that was visible. Without a named outcome there is no way that the objectives can be seen to have been completed. (See workbook 6 section 6.11)

Not Project Bounded - there were many students who cited operational objectives as outcomes. For example it was common to see lines such as such things as "To improve the workflow in the invoicing section". Here is a case where such an outcome cannot be written into a document or be in practical terms viewed and so cannot be used in a project. Typically, unbounded objectives refer to something that might happen based on the project outcome after the actual project has been completed (See workbook 6 section 6.11)

Objectives as Requirements - very commonly but still rather worryingly, many students, on Engineering projects, seem to think that objectives are the same as application requirements. (See workbook 6 section 6.11)

Objectives as Benefits - less commonly but still rather worryingly, many students, on Engineering and study projects, seem to think that objectives are the same as benefits. For example, in a study project on CRM systems what one often finds in place of project objectives is a list of benefits of implementing CRM. Similarly, for Engineering projects we see objectives written as a set of benefits of using the application being built later on in the real world. (See workbook 6 section 6.11)

9.8.4 Literature Review

In research the literature review is regarded as being essentially preparation of the mind. It follows, that to be serious about this step one has to be evaluatory and reflective as you read and write. Ideally one needs a strong theme which is used to weave an expository and exploratory discourse that unites and builds one's understanding and ideas with what has been written by other authors on one's core topic area.

For projects a full literature review is only needed in the case of a study project. For Engineering all that is required is a thorough overview of the application area. So for example, if an application were about Insurance brokerage then all that is required is a description of what brokerage is but only to the level necessary to understand the requirements. With this aim in mind: (See workbook 5 but section 5.2 and 5.6 should be studied with care)

Structure - many reviews were poorly structured and one often felt that the students had just written down the material as it occurred to them without any thought as to a wider readership.

Theme - often there was no detectable theme connecting the various sections of the review narrative and a reader would therefore be forced to guess and see how all the various elements were connected.

Value Added - the most common flaw was to see a review that was entirely or almost entirely made up of quotations, paraphrases or summaries so that the 'hand' of the student was not detectable anywhere in the work. Such work is not evaluatory and gives no indication whatever that the student has learned anything of value or indeed anything at all. It is often the case that one feels the student has no notion of the literature being a driver that may mean they have to accept new knowledge, gain further experience, modify existing knowledge or even abandon what they thought was sacrosanct and sadly no belief that their own views and experiences are also important.

Citation Style - two things are evident here. Firstly, one finds that too often citations are limited to the Literature Review. Secondly, the actual style used is very poor and commonly we see the form (Burk, 1992 p45) placed at the end of a sentence or paragraph. This is not acceptable and can only mean the whole paragraph has been paraphrased. The ONLY correct use of this bracketed style is in a passing reference to a text. (See workbook 8)

Worthless Quotes/Paraphrases - it is unfortunately only too common to see an appeal to some text or other for information that tells you either common knowledge or makes an obvious observation and so the citation is worthless and is representative of weak scholarship and laziness where a student is just trying to add a citation because he knows that such things are desirable. For example, quoting an author who says that "Object Orientation is now routinely used in software construction" is representative of common knowledge or quoting an authors who "says change is inevitable in organisations" is something that one might regard as obvious.

9.8.5 Research Design

These were often far from satisfactory and often read like a joke delivered without the punch line. The students are taught that essentially there are two phases. The first phase is the process used to get primary data items that are formed into a collection. Once the collection phase is completed we move on to the second phase of processing where the collection of primary data is processed to get an answer in the form expected. Particular points are:

Research Phases - In many case students were unable to distinguish the processing needed to get a collection of primary data and processing of the collection of primary data to get an outcome. It is quite common to see these two phases ignored or become competed muddled leading to a poor research outcome because the student loses his/her focus and often appear to have no clear idea what they are doing. The phases are:

Phase 1 - a process or processes used to define and create a primary data collection. It typically has four steps: define the data based on the Basic Activity for Generating Data, locate the data sources, collect the data and present the data.

Phase 2 - a process or processes used to manipulate the collection of primary data to get the form of answer expected.

No Outcome - often it seemed as if the student had no idea what form of outcome to expect so when one looked at the processing there was no sense that the primary data was being transformed into the required form of outcome.

Primary Data - many students seem to have only a vague notion of what primary data is and will often, very often, confuse or think that primary data is the same as the method of collection. This confusion is often evident with some students thinking that only questionnaire data could possibly be primary data.

Primary Data Definition - Primary Data is new data in the sense that it will not exist as a collection until I (you) define, collect and record it. But it must be collected for a specific purpose in that the primary data collection is representative of some aspect of the area under investigation and can be processed to get a defined form of outcome that will resolve or partially resolve a stated problem theme. All projects must be based on the collection and processing of primary data.

For example, one student took the definition and then read through an accounting system manual for his company and extracted all the functions and claimed that was primary data because he was going to use it to define what an accounts package should have by way of functionality but seemed unable to see that the manual had effectively done that already. (See workbook 6 section 6.6)

Research Method Justification - often students could not distinguish between Research Method and Data Collection Protocols. Research Methods are frameworks such as Case Study, Experiment, Action Research and so on. Collection protocols are based on: interview, questionnaire, observation, role playing, seminars, focus groups and so on. The sorts of justifications used are of the form "I have chosen case study because Saunders (2005, p92) said case studies are good... This is hopeless and implies no real thought. Justification must be built from a sound understanding of a particular Research Question, its expected form of outcome and the Primary Data needs and at least an overview of which method is likely to be best in a given situation. (see Workbook 7)

Practicality - many plans were over-complicated with students trying to use multiple methods and then ending up with masses of data they had no idea what to do with. There is only limited time and so students should be encouraged to focus on just one Research Method although of course several protocols may be involved.

Data Collections - in many cases all an examiner was able to see were results but often one simply could not tell if any primary data collection was involved and the results just seemed to appear 'out of the air'. The marking guide is quite specific and projects must be clear about both processed data and raw primary data collections. Without this we cannot feel confident that students have done any actual research. Typically, the collection of primary data is placed in an appendix and might be in the form of a summary table of questionnaires results or summarised transcripts. Correspondingly, the processed primary data collection is expressed as charts, graphs, tables, reports and so on in the body of the project report.

Processing - this is one of the most disappointing elements. Processing is all about transforming your collection of primary data into the form of outcome expected. Far too often all we see is the processing of individual primary data items with no attempt or very weak attempts to really supply an answer to the Research Question in the form that was specified.

Location - there were quite a few projects where it was more or less impossible to see where the primary data came from and often this was accompanied by a very ordinary set of results that could have been written by almost anybody with a superficial knowledge of the subject area.

9.8.6 Research Results Processing

There were some very good examples but often this section was very routine and very disappointing.

Repeating - it was very common to see a chart for example, displayed and then underneath the student simply repeated the data that was in the chart in words. Such a practice is worthless. What any data related narrative is supposed to do is to tell the reader what the data means and what implication it might have - that is we expect to see some analysis and evaluation of the data in terms of the Research Question.

Focus - the focus of processing the primary data is to create a kind of transformation that generates from the collection of primary data the expected project outcome - unfortunately, this aspect was often absent. Typically in a survey for instance we have page after page of charts analysing individual data items but no attempt to sum it all up and reach a conclusion based around the Research Question.

9.8.7 Evaluation and Conclusions

These sections in a lot of student work are indistinguishable. The reason there are two sections with marks attached is because:

Evaluation - here one focuses specifically on the project outcome and research methods - that is we evaluate our product (outcome) and the methods used to generate it. Notice here this is NOT about generating the outcome that would have been done in the research processing section

Conclusions - here the attempt is made to say what it all means - that is trying to generalize the findings. So for example, suppose the outcome is about the use of Agent technology in eCommerce web sites then in conclusions one might try to say what a particular project outcome means for any eCommerce site or in fact any website. In a similar kind of way, if a particular application had been built we might try to say whether it might be applicable in other situations or whether some features of the design can be transferred to all applications of that type.

9.8.8 Ignorance of Project Marking Criteria

Many students show an almost complete disregard for the way a project is marked and so often automatically lose marks. Students must therefore carefully study the marking forms so that they know what components are regarded as essential to any project and therefore carry marks. (See workbook 11 or 12 as appropriate)

10. WORKBOOK 10 – FORM: PROJECT SUBMISSION

This form **must** be completed and included in your project submission. If you are unable to tick every box then your work is not ready for submission.

Project Word Count	Exclude appendices. If maximum is exceeded marks may be lost or the project rejected
	The report length is within the stated guidelines (15,000 words maximum excluding appendices)
	I have included all making elements indicated in workbook 11 Or 12 as appropriate and noted the marking guidance notes
	I have studied the guidance notes on common project faults found in section 9.6
	I have prepared two bound copies of all my project work including any separate appendices
	I understand that I may use one or both sides of the paper when printing the report.
	I have included a full contents list, table list and diagram list all numbered consistently
	I have used good quality A4 paper, normally in portrait orientation with a weight between of 80 and 100gsm.
	I have made sure that the pages are in the right order and none are missing
	I have used MS word .doc format
	I have formatted the front cover and title page as required and added the necessary plagiarism declaration.
	All my text is single line spaced at 6 lines per inch/25.4 mm.
	All my main text, including headings is in 12-point font (Arial Narrow is recommended)
	All my text in tables and diagrams is 10-point font (Arial Narrow is recommended)
	All main text is right and left justified
	No headings at whatever level are indented
	Headings are NOT followed by a blank line
	Headings are in the same font and size as the main text but are shown in bold type
	No numbered headings are orphaned (that is all heading must be followed by some text not immediately by another heading)
	I have used a single blank line to separate paragraphs
	All chapters and appendices are numbered sequentially (1, 2, 3,...)
	All subsections are numbered (2.1, 2.2,...) and none of my sections numbers exceed three levels (1.2.1, 1.2.3 ...)
	All my margins: (top, bottom, left and right) are 20mm
	All pages have footers in 10-pt Arial Narrow in form: Page 12 of 97 - J.Letto Student No. 567543 Submission Date: 12.10.07
	I have cited other people's work properly using the Harvard APA format
	I have included all citations in my list of references
	My abstract accurately summarises all of the report, not just parts of it
	All my chapters and appendices start on a new page
	I have included appendices, where appropriate, covering: project specification, Project Plan, Requirements document(s), design document, screen shots, source code, user documentation, test results, evaluation results, questionnaires, etc.
	My supervisor has read each chapter as the work progressed.
	My supervisor has read the whole report
	I understand that indented sentences can be used where appropriate but bullets are not recommended (see 9.3.1)
	I understand that page headers are not required
	I understand that each of my chapters should start with an introductory section that explains what the chapter is about
	I understand that each of my chapters should end with a summary and a helpful link to the next chapter
	I have fixed a copy in .doc format of the project document and any appendices on floppy/CD/DVD to my project submission
	All my primary data (including requirements data) is original to this study and collected by me for this specific project purpose
	My primary data collection is available in the project document or appendix (if necessary in edited or summarised form)
	Engineering Projects only - I have included an executable file of my application on an attached floppy/CD/DVD
	Engineering Projects only - Application Operating instruction are on the attached floppy/CD/DVD as well as in the appendix
	Engineering Projects only – In my application I have not used illegal copies of any software or included any software where there is an expiry date which may render the application inoperable in the future.
	Engineering Projects only - I understand that the copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If, and only if, this is not possible then I have included in my project a supervisor signed set of screen shots in the appendix confirming that he/she has viewed the application in action.
Signature of Student. _____ Date. _____	

11. WORKBOOK 11 – FORM: STUDY PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

STUDY STYLE		Postgraduate Project Marking Form						STUDY STYLE	
Name of Student							HEMIS No.		
Brief Project Title							Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion						Re-Work	New Topic	
Name: Supervisor									
Name: Marker									
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker		
Project Unit	PJ.NCC								
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected						
External Examiner	N	Y	Refer to the External Examiner (if "Y" add comment in section G)						
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit						
References: See Workbook 11 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes									
Section A - Marks for Planning and Preparation							Weight	Mark	
1.	Project specification, including project plan						5		
2.	Review of the topic area literature						15		
Sub-Total							20		
Section B - Marks for Project Introduction									
3.	Presenting problem and its exploration including the Research Question						5		
4.	Discussion of the project's scope, scale, aim and objectives						10		
Sub-Total							15		
Section C - Marks for Project Primary Data Research and Outcome Generation									
5.	Selection and justification of Research Method						5		
6.	Primary data collection plan including data specification						10		
7.	Primary data processing plan to get expected outcome						10		
8.	Presentation and discussion of the collection of Primary Data						10		
9.	Description and discussion of main project outcome						10		
Sub-Total							45		
Section D - Marks for Project Evaluation and Conclusions									
10.	Evaluation of the project outcome (Project Specific)						5		
11.	Evaluation of project practice (Project Specific)						5		
12.	Statement of conclusions and reflections (Project Generalisations)						10		
Sub-Total							20		
Section E – Qualitative Assessment matrix based on University Grade Criteria									
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words			
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless			
3.	Report structure	very poor	poor	satisfactory	good	excellent			
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report			
5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours			
6.	Project idea	trivial	easy	modest	challenging	Difficult			

7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Primary data collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Data processing	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
14.	Main project outcome	Worthless	obvious	useful	original	exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Study Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes found in Workbook 14.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.2 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the topic area literature

Reference: Workbook 5 section 5.2 and 5.6 in particular, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers and generally be focused on the central project topic. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and its exploration including the Research Question

Reference: Workbook 3 section 3.3 and 3.5.1, Workbook 6 sections 6.2, 6.6 and 6.7 and Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Research Question with a defined form of answer (project outcome). It is very common to see an expression of a problem as "my problem is to find a solution to..." or expressed in such a way that it is in effect a solution and such expressions are indicative of students who do not know what the problem is but nevertheless know what the solution is. Similarly, students who list multiple problems, have no Research Question (or a very poor one) and do not discuss the form of outcome expected are embarking upon projects where there is no clear focus and these typically fragment when it comes to the core research and one most often cannot find any clear project outcome later in the work. It is also useful at this stage if there is some indication of the Basic Activity for Generating Data (BAGeD) so that one can feel sure that the student is aware of what primary data they need in order to generate the intended outcome.

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.2 (example), Workbook 6 section 6.1 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition, expected form of outcome and Research Question all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Selection and justification of Research Method

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful choice of Research Method focused on resolving the stated problem theme. In practice this implies a consideration of primary data needs, location of primary data and the collection protocols that might be used. Markers should guard against rationales that amount to saying that some text book or other said method X or Y was good for certain kinds of scenario – that is copies of generalisations about Research Methods found in books do not amount to a rational for a specific research situation. Furthermore, markers need to feel confident that the student understands the distinction between a Research Method and the collection protocols used within them.

6. Primary data collection plan including data specification

Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

This is a crucial stage in a research based project and markers must be confident that the plan is practical. A marker must look for a clear core activity represented by a statement about of BAGeD and that core activity should be surrounded by whatever other processes are needed to ensure reliable collection of the primary data. The whole primary data collection plan has four steps which must be visible in the project document: data definition, data location, data collection and how the whole collection of primary data is to be presented. Markers should also take care that the formation of a collection of primary data is not confused with the processing of it to get the stated project outcome.

7. Primary data processing plan and presentation of the expected outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for clear evidence that the student has taken the collection of primary data they obtained earlier in the project and now process that whole collection to get to a clear presentation of the project outcome. It is therefore important that markers can see what processes were applied to the collection of primary data to get the outcome – without this process visibility there is no evidence as to how the project outcome was actually obtained. Markers should be wary of processing plans that say such things as “I will look at the data” or “I will analyze the data” or “I will use SPSS” as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same data collection they could apply the same processes and get the same or at least a very similar outcome.
Markers should also be aware that very often students will often process individual data items – such as might be found on a questionnaire, but never get to a point where the stated project outcome is derived from the collection of data.
8. Presentation and discussion of the collection of Primary Data
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for visible signs of the collected primary data. The primary data collection is most often presented in tabular form in the appendix and might be displayed as graphs, charts, tables or diagrams in the main project document.
9. Expression and description of main project outcome
Reference: Workbook 3 section 3.5.2 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
The intended project outcome must be clearly visible – for example if the intended outcome is a model then that must be clearly shown in some acceptable form and be based on the processing plan outline in section 7. Markers must therefore take great care that the presentation of primary data and the processing of individual data items in the collection are not offered as a substitute for the student generating the intended project outcome.
Section D - Marks for Project Evaluation and Conclusions
10. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project outcome so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution (project outcome) or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project outcome. The section is not intended for vague thoughts about the topic but a considered evaluation of the project outcome when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
11. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate here. This section is important as this is where one expects to find some information on what the student has learned about the way they work and the tools they used. It is unfortunately often the case that students have very little idea about what they did apart from stating vague activities such as “look at”, “analyze” or “use SPSS” so without anything concrete to evaluate they resort to the routine and say “the survey process went very well” or “my case studies generated useful data” or else they simply ignore this form of evaluation altogether. Evaluation of project practice is difficult and the most usual way is by asking searching questions related to process success and the notion of good practice and best practice based on performance criteria and simply asking ‘how did I do it’, ‘was it successful’ and ‘could I or should I on reflection have done it another way’. Additionally, one needs to be aware of any constraints involved, including time management and particular skills that might have impacted on the use of best possible practices.
12. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if a project outcome was based on case studies and the outcome was a review of IT outsourcing in Hong Kong then here we might expect to see the student consider the outcome he obtained which refers to Hong Kong and then consider and discuss whether that outcome has wide applicability, for example, to China, South East Asia or even the world as part of a Global economy or is it just specific to that local situation. Essentially, one is asking what do the outcome ‘mean’ when set in a wider setting. It follows that the focus of awarding marks here is for project generalisations.
It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such as future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

12. WORKBOOK 12 – FORM: ENGINEERING PROJECT MARKING

The form shown below is included for reference only so that you can see how your project will be marked.

ENGINEERING STYLE		Postgraduate Project Marking Form				ENGINEERING STYLE	
Name of Student					HEMIS No.		
Brief Project Title					Total Mark	%	
Recommendation	If the mark awarded is a fail circle your opinion				Re-Work	New Topic	
Name: Supervisor							
Name: Marker							
Marker Status	Supervisor		Moderator		3 rd Marker		Re-Marker
Project Unit	PJ.PEA						
Plagiarism	N	Y	Is PLAGIARISM or another unfair act is suspected				
External Examiner	N	Y	Refer project to the External Examiner (if "Y" complete section G)				
Content	Y	N	Can you confirm that this project fulfils the criteria for the Unit				
References: See Workbook 12 for detailed marking guidelines and Workbook 14 for general expectation and grade criteria notes							
Section A - Marks for Planning and Preparation					Weight	Mark	
1.	Project specification, including project plan				5		
2.	Review of the application/product area and its client/business setting				10		
Sub-Total					15		
Section B - Marks for Project Introduction							
3.	Presenting problem and outline proposal				5		
4.	Discussion of the project scope, scale, constraints, aim and objectives				10		
Sub-Total					15		
Section C - Marks for Project Primary Data Research and Outcome Generation							
5.	Detailed requirements collection plan based on proposal				5		
6.	Analysis of requirements: functional, performance, technical and usability				5		
7.	Presentation, analysis and discussion of the design				10		
8.	Discussion of build process and design implementation				10		
9.	Application testing process and results				5		
10.	Implementation plans				5		
11.	Attributes of the project artefact (e.g. quality, reliability, etc)				10		
Sub-Total					50		
Section D - Marks for Project Evaluation and Conclusions							
12.	Evaluation of project product against requirements (project Specific)				5		
13.	Evaluation of project practice (project specific)				5		
14.	Statement of conclusions and reflections (project generalisations)				10		
Sub-Total					20		
Section E – Qualitative Assessment matrix based on University Grade Criteria							
1.	Length of the report	too long	a bit on the long side	a bit too short	needs expansion	about 12k words	
2.	Spelling and grammar	was full of mistakes	had many mistakes	had a few mistakes	a few minor mistakes	was flawless	
3.	Report structure	very poor	poor	satisfactory	good	Excellent	
4.	Appendices to report	completely irrelevant	largely irrelevant to the report	mix of relevant and irrelevant material	mostly relevant	relevant and referenced in report	

5.	Student effort	clearly less than the required hours	less than the required hours	about the required number of hours	probably more than the required hours	clearly more than the required hours
6.	Project idea	trivial	easy	modest	challenging	difficult
7.	Project aim	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
8.	Project objectives	unstated	vaguely discernible	stated but not clearly	clearly stated	precise and concise
9.	Literature review	not provided	superficial and not evaluative	Adequate with some evaluation	thoroughly evaluative	extensive, evaluative and relevant
10.	Ideas taken from elsewhere	not credited	not credited but minor	usually correctly cited	cited correctly	correctly cited and well used in the text
11.	Project content	entirely based on existing material	a rehash of existing material	nothing really new, but solid	partly original	totally original
12.	Requirements Collection	no reliable data obtained	little reliable data obtained	some data obtained but only of a routine nature	useful data obtained but of limited scope	useful data obtained in a careful and planned manner
13.	Design Expression	no evidence	vaguely discernable	stated but not clearly	clearly stated	precise and clear
15.	Artefact Evaluation	worthless	obvious	useful	original	Exceptional
15.	Outcome evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
16.	Practice evaluation	not stated	trite	stated briefly and not based on the project	lacked reflective depth	insightful, original and reflective
17.	Conclusions	not stated	trite	stated briefly but mostly routinely observations	stated but not entirely derived from the project outcome	insightful, generalised and derived from the project outcome
18.	Overall assessment	very poor	a bit poor	satisfactory	pretty good	worthy of publication

Section F – Marker's Critical Comments

Section G – Note here elements you want brought to the attention of the External Examiners

Signed		Dated	
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Engineering Format Marking Form Guidance notes

These notes must be read in conjunction with the grade criteria and associated notes.

Section A - Marks for Planning and Preparation

1. Project specification, including project plan

Reference: Workbook 3 section 3.3 for general notes and section 3.5.1 for an example specification

Marks should be awarded for a complete specification and a reasonable plan that spans at least 18 weeks study time. When examining the project plan markers should look for some degree of originality and an indication that it is related to the particular project and not just a copy, with changed dates, of one of the sample plans shown in Workbook 3.

2. Review of the application/product area and its client/business setting

Reference: Workbook 5 section 5.2 and 5.6, Workbook 8 and Workbook 9 section 9.6.4

Here one looks for a good structure based on a clear theme that supports and prepares a student for the core project activity. The material covered should be relevant and presented in a reflective and measured fashion with regard to its readers. In Engineering projects the expectation is that the review will focus on the application area and be in enough detail to at least understand and gather the requirements. It is permitted to include technical material if they have a special or unusual significance to the application area but in so doing students must be aware that the routine inclusion of what at this level might be regarded as common knowledge in computing/IT will not attract any marks. The review itself must be expository and evaluatory in nature and the 'hand' of the student must be seen as the literature is cited and used in the text. The key features are summed up in the acronym FRAMED whose explanation can be found in section 5.1.

Section B - Marks for Project Introduction

3. Presenting problem and Outline Proposal

Reference: Workbook 3 section 3.3 and 3.5.1 Workbook 6.2 and 6.5, Workbook 9 section 9.6.1

All projects are supposed to be based on one clear problem definition expressed at a suitable level of resolution. Markers must therefore feel sure that they know what that problem is and how the student has theorized about its nature, importance and its possible resolution and that discussion culminating in a lucid Application Outline expressed as a functional description. It is very common to see an expression of a problem as "my problem is to find a solution to..." and this is indicative of students who do not know what the problem is but nevertheless know what the solution is. Students who list multiple problems, have no functional description (or a very poor one) are indicative of projects where there is no clear focus and these typically fragment when it comes to requirements gathering and often end in a very trivial application. Markers should be aware that students may avoid giving a functional description and instead offer a generic architectural one and this must be penalised as the student clearly does not know what function the application supplies

4. Discussion of the project's scope, scale, aim and objectives

Reference: Workbook 3 section 3.5.1 (example), Workbook 6 section 6.11, 6.9 and Workbook 9 section 9.6.3.

Markers should look for an aim expressed ideally as a single action leading to an identifiable target related to the problem definition. The aim is to be supported by a sound and sequential set of objectives (4 to 6 is recommended) each one being an activity that can be carried out by the student within the project period resulting in a measurable outcome that can be expressed in a document. The expression of scope and scale may be explicitly stated or may be implicit in the way the aim and objectives are worded. Markers should also be aware that working through the early stages of problem definition and Application Outline all contribute to an expression of scope but the scale may be expressed later in the Research Design itself.

Section C - Marks for Project Primary Data Research and Outcome Generation

5. Detailed requirements collection plan based on proposal

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers should look for a rational and thoughtful consideration of the Requirement Gathering process focused on obtaining sufficient information to build the intended application and resolve the stated problem theme. In practice this implies a consideration of application functions, location of requirements data and the collection protocols that might be used. Normally in research one would expect a rationale for the choice of Research Method but for Engineering projects it is taken for granted that the method is requirements gathering. Instead one should look for a clear focus on constructing a feasible and comprehensive requirements document based on the application outline. Furthermore, markers need to feel confident that the student understands the distinction between Requirement Gathering as a Research Method and the collection protocols used within it.

6. Analysis of requirements: functional, performance, technical and usability

Reference: Workbook 3 section 3.5.1 (example) and Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6

Markers must look for a clear Application Proposal and a requirements catalogue. Here one needs to see a discussion of the requirements to ensure they are credible (realistic), comprehensive, complete and stakeholders have been considered. One might also usefully consider the approach that was taken to gain them and whether they are of the form of strategic, tactical or operational.

7. Presentation, analysis and discussion of the design
Reference: Workbook 9 sections 9.6.5 and 9.6.6 and Workbook 7 section 7.9
Marks are awarded here for clear evidence that the student has taken the requirements obtained earlier in the project and processed them to get a suitable design. Therefore, markers must be able to see a clear link from requirements to design and where necessary observe how the requirements were processed. Markers should be wary of processing plans that say such things as "I will look at the requirements" or "I will analyze the requirements" as these directions tell us nothing of value. The criteria used to assess the processing plan is that there must be enough detail so that if another person were presented with the same requirements they could apply the same processes and get the same or at least a very similar outcome.
8. Discussion of build process and design implementation
Reference: Workbook 7, Workbook 9 sections 9.6.5 and 9.6.6
Marks are awarded here for a rational discussion as to what architecture, components, languages and tools and so on are needed to best implement the design. This discussion may also imply the various situation constraints have to be considered as well.
9. Application testing process and results
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers must look for evidences of a testing plan and a consideration of test results. Typically the plan and results are placed in the main project document in outline form with the details in an appendix. Often students will just discuss white or black box testing or regression testing or something similar but without any actual test plans or results – in such cases marks should not be awarded as these materials are considered common knowledge at this level – however brief references to it are permitted.
10. Implementation plans
Reference: Workbook 9 sections 9.6.5 and 9.6.6
Markers should look for a comprehensive implementation plan – it need not be extensive or in minute detail but it should cover installation, user training, data conversion/loading, change over, user acceptance and hand-over.
11. Attributes of the project artefact (e.g. quality, reliability, etc)
Reference: none
The intended project application must be clearly visible and available to run directly from a disc or DVD. Markers are to award marks based on their perception of the general quality of the application if they were to put themselves in the place of a user. Assessment may then consider colour scheme, ease of use, operating instructions, presentation (does it look as if its finished), speed, etc.
Section D - Marks for Project Evaluation and Conclusions
12. Evaluation of the project outcome (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project application so generalisations are not appropriate here. The section is important as this is where one expects to find some information on what the student has learned about the problem situation and the significance of solution or partial solution they have generated. Unfortunately, in many projects this section is missing, cursory or so routine that it has nothing to do with the project application. The section is not intended for vague thoughts about the situation or application but a considered evaluation of the project application when viewed against the problem definition as stated earlier in the work and its setting. Typically, evaluation is against objectives, other existing products, using defined criteria or some form of expert evaluation coupled with any constraints that might have impacted on applicability of the outcome or its generation.
13. Evaluation of project practice (project specific)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
This section is specific to the project practice so generalisations are not appropriate. This is where one expects to find some information on what the student has learned, the way they work and the tools they used. It is often the case that students have very little idea what they did apart from being able to state vague activities such "look at" or "analyze" so without anything concrete to evaluate they resort to the routine and say "the survey process went very well" or "the UML modelling was straightforward" or else they simply ignore this form of evaluation. Evaluation of project practice is difficult because the student must ask searching questions related to process success and the notion of good and best practice based on performance criteria and simply asking 'how did I do it', 'was it successful' and 'could I or should I on reflection have done it another way' or "what were my constraints".
14. Statement of conclusions and reflections (Project Generalisations)
Reference: Workbook 9 section 9.2.4 and 9.6.7 and Table 6
In this section markers should expect to find generalisations based on the project outcome and project practice. For example, if an application was for eCommerce selling shoes it might be possible to ask what aspect of that application could be re-used to sell other product. It is permissible to consider other elements but not at the expense of the generalisations being omitted or lacking in reflective depth. However, elements such future work, features of the practice that are applicable more generally, part or all of the outcome that is useful outside its immediate setting, usefulness and availability of literature sources, relevant aspect of the course, what main lessons were learned or value-added features. Normally, if a student discusses his/her objectives here it is a good sign that they have confused evaluation and conclusions. Objectives are mostly project specific and should not therefore be discussed here but only in the evaluation.

Section E – Qualitative Assessment matrix based on University Grade Criteria

This matrix allows the marker to make a rough qualitative assessment of project work and this is characterised by a left (poor) to right (good) orientation. The matrix is designed to work with the University grade criteria and acts as summary of your assessment of the various elements and as a check that the actual mark you awarded is a fair reflection of the student's work. Once you have made this assessment you need not comment any further in section F on the various points unless it is to add a note of clarification or to indicate that your assessment is conditional. For example, if you assess spelling and grammar as "was full of mistakes" there is little point in repeating that as a free comment however, if conclude that the report structure is "very poor" you might want to say why that is so.

If the comment row is for whatever reason not applicable it is customary to place a cross in the row number but it is not necessary to explain why this is so in section F.

Section F – Marker's Critical Comments

In this section it is expected that you will provide a critical reflection that summarises your view of the project as a whole after the marking has been completed. In arriving at such a view one needs to be mindful of the visibility of the project outcomes and an evidential trace so that it can be seen how the outcome was generated. It is useful if you can highlight major weakness, interesting observations made by the student or other novel features of the work.

Written comment is especially welcome and useful when the mark is either >69% or <40% to give the Unit Assessment Board some indication of why your thought the work was either in these ranges. When you explain your thinking here it must be based solely on the work presented and not on such things as "good worker", "always tries hard", "a dedicated student", "never gives up" or other personal observation of that kind. Of course the attitude of the student is important but that is not what is being assessed. The role of assessment is related to the Learning Outcomes for the project Unit expressed in the overall quality of the work produced.

Section G – Note here elements you want brought to the attention of the External Examiners

This section must be completed whenever you feel there is something **exceptional** you want brought to the attention of the External Examiner as indicated in the header lines to the mark form. Typically, a marker will refer to the External exceptional pieces of work, work where there is some question as to whether it meets the course criteria (for example instead of submitting a project on some aspect of IT they submit one on marketing) or where a matter principle is at stake – for example one might have a project which is very good except that the English is very poor.

Markers must note that refers should be exceptional and when it is done one is only to seek opinion. It is not permitted to refer to the External Examiners a project for a decision.

13. WORKBOOK 13 – FORM: PROJECT MARKING RECONCILIATION

The form shown below is included for reference only so that you can see how your project will be marked.

Project Mark Reconciliation Form		Final Agreed Mark (%)	
Name of Student			
Brief Project Title			
Name: Supervisor			
Name: Second Marker			
Name: 3rd Marker			
<p>Cause – in this box, describe, for each applicable section, why the marking disagreement occurred.</p> <p>Rationale – in this box, If a mark can be agreed, explain the rationale used to reach agreement. Please note that it is only necessary to agree the total mark for each section not individual category marks.</p> <p>Irreconcilable - If you cannot agree a mark leave rationale blank and it will be filled in by a third marker who will place a tick in the small square box.</p>			
Section A - Marks for Planning and Preparation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section B - Marks for Project Introduction		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section C - Marks for Project Primary Research and Outcome Generation		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			
Section D - Marks for Project Evaluation and Conclusions		Agreed New Sub-Total	
Cause			
Rationale			
<input type="checkbox"/>			

14. WORKBOOK 14 – SUPERVISION AND MARKING GENERAL GUIDANCE NOTES

1. **Presented Work** - Marker's are reminded that any marks awarded must be solely based on the assessment of work presented within the mark categories listed on the mark forms. It is not permitted to award marks for "hard worker" or "tried very hard" or "was a good student" or any similar observation as there are no relevant mark categories and this kind of criteria is almost impossible to evidence.

When an Engineering artefact is presented it should be viewed in action to ascertain the mark for "Attributes of the Project Artefact". The copy of the application supplied on disc must be complete and run on any standard Windows based PC with a simple click or double click on an appropriate name or icon visible in the disc directory. If this is not the case then markers must assume that there is no evidence for the application and set the mark accordingly.

2. **Word Count** – on the project submission form there is a space for a word count (excluding appendices) and if this is exceeded then it is indicative of a deliberate attempt to go beyond recommendations and you may therefore find that it leads to laboured descriptions or inclusion of irrelevant material in the project document and you should therefore mark accordingly.
3. **Structure** – mark categories do not necessarily represent chapters in a project document and so Marker's need to be aware that a particular project may be structured in a way that does not correspond to the sequence presented on the mark forms (though it is recommended to do this when possible). However, all the elements on the marking form must be visible in the work presented.

Although it is recommended that the mark form sequences be followed in the project document that does not mean that there has to be a chapter for each mark category. Students, therefore, should be encouraged to merge sections in order to produce a concise document. For example, it is perfectly possible and reasonable to merge the two evaluation sections and conclusions into one chapter as long as the relevant mark elements are still visible.

4. **Appropriateness** - any work presented must be within the prescribed subject area for the course. If a marker suspects that this is not the case then they should consult with the relevant course leader for clarification. In such accepted cases markers must regard the primary data and its processing as not being appropriate and mark with that in mind.
5. **Evidence** - the project report or appendix must contain sufficient evidence that the core project research work has been done (not the literature review). That is, in the case of study project a marker must be able to see the primary data collection appropriately presented (usually in an appendix). In the case of Engineering projects it must be possible to see a suitable requirement document or catalogue (possibly in the appendix). Once the primary data is visible then it must also be possible to see how that data was transformed into the intended project outcome.
6. **Literature Support** - when marking Literature Reviews their content must be seen to be focused on the topic area and address clearly the associated problem theme without any irrelevant material with the intention of offering a concise discourse that is focused, relevant, authored, measured, evaluatory and expressed as a dialogue. (see section 5.1)
7. **Grade tables** - markers must be aware of the criteria associated with awarding a given overall mark as they may be required to justify it to the UAB in terms of the criteria stated in the table shown below.
8. **Process** – when marking it is important that the process used to get an outcome by the student is visible in the project document. In practice this means that it is possible to perform the following trace: presenting problem, discussion of how problem might be resolved, suggested form of project outcome, research design and execution, generation of stated outcome, evaluation and conclusions – viz:

Engineering – typically, the process starts with a business related or technical problem theme leading to a research plan for the collection and discussion of requirements and their transformation into a suitable design and associated architecture. From this there should follow a build, implement and testing process with the whole project completed with suitable project specific evaluations and conclusions containing generalisations.

Study – typically, the process starts with a business or strategic IT related problem theme leading to a research plan for the collection and discussion of primary data and its transformation into an outcome that would resolve or go some way to resolving the stated problem theme. The whole

project is then completed with suitable project specific evaluations and conclusions containing generalisations.

Marks	Master's Level Grade Criteria
70 – 100	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Excellent work - able to express an original reasoned argument in a lucid manner by reviewing & critiquing a wide range of material. Original, critical thinking based on outstanding insight, knowledge & understanding of material. Material contributes to current understanding & is of potentially publishable quality in terms of presentation and content ▪ Wide reaching research showing breadth & depth of sources
60 – 69	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Clear, balanced coherent critical & rigorous analysis of the subject matter. Detailed understanding of knowledge & theory expressed with clarity ▪ Extensive use of relevant & current literature to view topic in perspective, analyse context & develop new explanations and theories
50 – 59	<p>As below plus:</p> <ul style="list-style-type: none"> ▪ Detailed review and grasp of pertinent issues & a critical contextual overview of the literature. Thorough knowledge of theory and methods & uses this to underpin arguments and conclusions ▪ Confidence in understanding and using literature
40 – 49	<ul style="list-style-type: none"> ▪ Demonstrates grasp of key concepts & an ability to develop & support an argument in a predominately descriptive way with valid conclusions draw from the research ▪ Familiarity with key literature which is cited and presented according to convention ▪ Logical & clear structure, well-organised with good use of language and supporting material
0 – 39	<p>FAIL – Some knowledge of relevant concepts & literature but significant gaps in understanding and/or knowledge. Little attempt at evaluation, conclusions vague, ambiguous & not based on researched material. Limited or inappropriate research. Deficits in length, structure, presentation &/or prose.</p>

15. WORKBOOK 15 – FORM: UNIT FEEDBACK REPORT

This form may be used by you to feedback to the University your experiences in the courses. It is normally sent to your tutor at the end of the course.

Unit Level Feedback – Delivery Evaluation for Online Units						FF.2.3	Page 1 of 1
This student feedback questionnaire is intended to help students provide constructive feedback to the unit lecturer.							
Student Name (Optional)						Cohort	
Unit Name							
Lecturer							
Q	Good					Place a ✓ to rate each factor from strongly disagree to strongly agree in one of the 5 boxes	
1						Chat sessions started promptly.	
2						Char sessions were structured usefully for learning.	
3						Chat content helped my understanding	
4						Chat Tutor handled student questions sympathetically	
5						Chat Tutor used helpful examples where necessary	
6						Chat Tutor answered session questions in a helpful manner.	
7						Chat sessions stimulated me to think beyond the material delivered.	
8						Chat topics were often related to real-world situations.	
9						Chat Tutor encouraged students to participate during the session.	
10						The Tutor was expert in the subject area.	
11						The written notes provided were helpful to my learning.	
12						The study pack Workbooks were helpful in my assessment preparation.	
13						The 5 milestone tests helped me to confirm my knowledge.	
14						Tutor responded in a timely fashion to discussion board questions.	
15						Tutor responded in a timely to my email communications.	
16						Tutor was sensitive to the problems of individual students.	
17						The assessed work stimulated me to think deeply about my project.	
18						Feedback on my progress was available.	
19						The topic approval process helped me think clearly about my project.	
20						Written assignment specifications were clear.	
						For Official Use Only	
General Comments:							

Exercise 004b.01a – Finding a Basic Activity Word Spotlight

This exercise and example sheet takes you through the whole of the research process. I have summarised all the things you need to know and provided some partial and some full samples. You must go to the partial example and complete them by looking at various elements and using them to write a research question. I will NOT be providing answers for all these samples (you will be doing that in discussion) and they are there for you to practice and use in your groups. Please don't avoid the work, you MUST get to a stage of knowing that what you have written is correct – if you don't know it's correct then you are not ready to do your own.

To start this off complete one or more of the examples and post the resultant Research Question into the discussion Board where I and others can comment.

Basic Activity Word – this entry will give a concise definition of the word
WARNING – in the Research Methods course the following key words have a defined meaning and you MUST study the relevant entries in the workbook. DO NOT assume that you know what these mean else you are likely to get into considerable difficulties.
Problem – this must define a single core problem for which you are going to find a solution route
Target – these are the effects that will be evident in the real world if the problem can be solved. It is permissible to list more than one effect but it is best to look for the principle one.
Outcome – this is the object you will generate as the final product of your MSc project. Possible outcomes are characterised by nouns so might be: reports, models, frameworks, policies, strategies, position papers, reviews, procedure description, best practice descriptions, dictionaries, lexicons, concordances, protocols, dossier, diagrams, charts, plans, etc.
Actor - It is normal when you define your outcome to say who the actor or actors are (meaning persons) who will use your defined outcome and to show that its use by them leads to the target effects
Activity and Data Spotlight – this is just about focusing on exactly the primary data that you need and nothing else. There are two parts really here: the activity: account for, analyses, collate and so on and the spotlight, the place where the data comes from
Research Question – this is a sentence expressed as a lucid question that connects the various features and expresses the direction of your research and summarises your whole project. The 6 elements are: interrogative, outcome, actor, problem, target and spotlight (data) - IO-APTS. The acronym IO-APTS is the correct order of these features in a sentence when the interrogative is “what” but for other interrogatives the order of features may need to change if you are to produce a valid sentence in English. Possible interrogatives are: Whose, who, whom, what, which, where, whence, whither, when, how, why, wherefore, does/is, s/are, and can.
Research Method – choosing a method will depend on many factors such as: context, time available, skills available, practicalities, access, reason for the study, what kind of outcome you want, cost, nature of the study quantitative/qualitative, scale, control, and sensitivity of the data and so on. In this set of examples I choose a Research Method based largely on the basic purpose of the study. Basic purpose is usually assumed to provide as an outcome one of the following forms: express an understanding, an exploration, a description, an explanation, an improvement suggestion, build something or prove something. Common Methods and typical uses are: Case Studies – useful when trying to understand a situation or practice Vignettes - useful for exploring a situation in order to illustrate its major features Action Research – useful when it is desirable to improve a situation by working within it Experiments – useful when one is trying to prove or more usually indicate the truth of some proposition Quasi-Experiments – as for experiments but the experiment can only be simulated Surveys – useful when trying to describe a situation or effect Biographies/History – useful when one wants to explore a situation in order to replicates it or improve it Grounded Theory – useful when the area under study is barely understood but needs to be explored Ethnography – useful when one wants to describe a situation of some kind involving behaviour Requirements Gathering – useful when one wishes to build a real world object
Collection Protocol – this describes the means by which the primary data is actually collected: interview, questionnaire, observation, role playing, seminar, focus groups, document or record searching etc
Pre-Processing – this describes how the primary data in its raw collected form is processed into a structured collection of some kind.
Outcome Processing – this describes how the structured primary data collection is used to generate the intended outcome.

Account for - Explain and clarify something by giving reasons
Problem – inventory discrepancies leading to additional costs and delivery delays.
Target – reduced inventory cost and assured delivery times to customers
Outcome – revised inventory processes model
Actor – manager or managers responsible for inventory systems
Activity and Data Spotlight – to account for (activity) inventory discrepancies caused by current procedures (spotlight)
Research Question – what (interrogative) revised inventory processes model (outcome) can be used by inventory managers (actors) to make changes to the current system in order to reduce or eliminate inventory losses (problem) so that costs are reduced and customer delivery times assured (target) by exploring and illustrating features of working practices in the current inventory system that might account for inventory discrepancies (spotlight).
Research Method – in this case I am basically exploring this problem situation looking for illustrations of why discrepancies occur so that leads me to think that the method of Vignettes is the most suitable research model here.
Collection Protocol – record searching coupled with interviews .
Pre-Processing – this raw primary data collection will be pre-processed in order to structure the collection into the form of a catalogue of processes description each with a weakness assessment.
Outcome Processing – the catalogue produced in the pre-processing stage will be used to generate the outcome of a set of revised inventory processes using the company best practice model. This outcome will then be used to reform the way the inventory is managed and in so doing allow managers to generate the target of reduced inventory losses, reduced costs and assured delivery times.

Analyse - Resolve something into its component part, or examine critically and minutely.
Problem – delays and errors in generating audit request data
Target – reducing the time taken to generate the requested data and at the same time improve its accuracy.
Outcome – a report with recommendations
Actor - management
Activity Data Spotlight – to analyse (activity) the process used to extract data from the accounting systems for audit requests (spotlight).
Research Question – what (interrogative) recommendations (outcome) can be generated and used by management (actors) to plan for the enhancement of current audit request procedures in order to ensure that delays and inaccuracies (problem) are eliminated (target) by a close analysis the audit request protocols (spotlight).
Research Method – here my primary need is to understand the audit request process and so I will treat each request as a small case study .
Collection Protocol – a form of role playing will be used to duplicated and simulate the request
Pre-processing – the extracted audit data and the request will be pre-processed into a matrix which will be formed by listing the request, process used, data sensitivity, classification and auditors assessment of data quality...
Outcome Processing – using a process model the data will be used to form a mapping of requests to consequence and hence derive tips with recommendations to management on the effectiveness of current audit processes. This outcome will then be used by management to make an informed decision on the way audit request are handled in the future and in so doing generate the target of reducing the time taken to generate the requested data and at the same time improve its accuracy.

					<p>– This is best thought of as something like forming an opinion about something. It might be quite simple such as forming an opinion as to whether something is good or bad but more often that not it's about forming an opinion about something after assessment or evaluation with regard to what can be done - so we might appraise whether a process for example should be left unchanged, modified or made redundant.</p>
					<p>– poor IT staff utilization as is apparent in increasing staff cost and high consultancy fees.</p>
					<p>– increased management awareness on current IT staff utilization practices</p>
					<p>– an assessment report on cost savings and other benefits that might accrue from a better utilization of existing staff.</p>
					<p>- departmental managers</p>
day	1	1	1	1	<p>(activity) the staff utilization practices with regard to IT technicians (spotlight)</p>
oi					<p>– How can (interrogative) effective utilization of IT staff (problem) be achieved after an appraisal of staff utilization practices (spotlight) in order to generate an assessment report (outcome) for use by departmental managers (actor) to aid and inform them in job distributions so that a reduction in costs can be achieved based on a maximization of existing staff's abilities (target)?</p>
					<p>– my basic need here is to develop the process so that leads me to believe that this method is most likely to give me a suitable research model.</p>
bt	Poi	1	1	1	<p>looking for example of utilization and how they were decided upon. It may be necessary to supplement this with literature.</p>
					<p>– the raw primary data will be grouped into groups based on a manager's assessment of each employee focused on the current company standard payroll scales.</p>
gi					<p>– the grouped utilization practices and managers assessment will be analysed using an in-house workflow model to derive estimate of possible cost savings and other benefits that might accrue from a better utilization of existing staff. This outcome will then be used to brief departmental managers in order that target of increased management awareness on current IT staff utilization practices is achieved in preparation for the bi-annual leadership meeting where this problem theme will be discussed.</p>

					<p>– Determine the value of something. Similar to evaluation but it is often useful to think of evaluation as a qualitative process and assessment as a quantitative one.</p>
					<p>– suspected under use of the new CRM system because some processes may have been inadvertently duplicated within the vestigial manual elements from the old system.</p>
					<p>– increased effectiveness centred on full use of the CRM system</p>
					<p>– list and rationale for the removal of suspected redundant processes</p>
					<p>– area managers</p>
day	1	1	1	1	<p>(activity) the impact of effectively duplicate processes (spotlight) on the overall operation of the CRM systems in relation to potential cost saving.</p>
oi					<p>– What (interrogative) rationale (outcome) can be found for the removal effectively redundant manual processes (problem) which can be used by area managers to reconfigure their CRM systems to increase its effectiveness and hence raise business productivity and reduce costs (target) by a assessment of the impact of suspected redundant processes on work flows (spotlight).</p>
					<p>– there are expected to many processes involved and it seems appropriate here to use a model because I need to understand why these duplicate processes co-exist.</p>
bt	Poi	1	1	1	<p>to obtain the processes followed up with the process assisted by</p>
gi					<p>– the various duplicate or almost duplicate processes will be analysed by their expected impact on overall system efficiency using a standard model based on the factors: utility, process cost, training commitment,</p>
gi					<p>– to obtain the outcome of the removal suspected redundant processes that can be removed from the system each process will be reviewed by a seminar panel of relevant managers. This outcome will then be used by area managers to decide what vestigial processes can safely be removed without affecting company throughput and in this way generate target of increased effectiveness centred on the full use of the new CRM system.</p>

	①	- This means to create an ordered collection of some sort where there is a logical order and the essence of the task is to enumerate and describe
	②	- variable tele-worker productivity in software development
	③	- assured worker productivity levels
	④	- worker stress report
	⑤	- product project managers
day 1	⑥	(activity) the stress effects imposed on tele-workers (spotlight) in a fast moving software development market....
goal	⑦	- How can (interrogative) managers gain assured productivity levels (problem and target) from tele-workers in software projects (spotlight) by commissioning a stress report (outcome) which will later be used by product project managers (actors) to plan an effective and balanced work schedule.
idea	⑧	- here I want to focus on this area so I am going to focus on and trace worker activities.
point	⑨	will be used to look for interesting or unusual candidate work activities by means of a focus on and trace their CV and
	⑩	- the interview and document data be processed using common text processing ideas to classify and prioritise the main stress effects and presented as standardised sheets.
goal	⑪	- based on the biographies a worker stress report will be prepared for management with an assessment of possible productivity impacts. This outcome will then be used by product project managers to balance workloads based on the various stress factors uncovered in the report and hence generate that of assured worker productivity level.

	①	- This is very simple as all one does is to identify the data and literally collect it as you see it. So if I were looking for SPAM instances then as soon as I find one I just file the whole SPAM email away for later processing.
	②	- customer complaints about delays in resolving problem via the help desk
	③	-
	④	-
	⑤	-
day 1	⑥	- will be based on (activity) help desk work requests and their associated actions (spotlight) that have been delayed for more the 48 hours...
goal	⑦	-
idea	⑧	- this is a potentially large population so for practical reasons I will use the format as I feel I am mainly trying to describe this situation.
point	⑨	- effectively the protocol where we one extract the above information from the help desk log.
	⑩	- classify the work requests into by: operative, system and action with a final assessment by the relevant manager of the main cause of the delay.
goal	⑪	- the prioritised list will be used to generate a plan to deal with identified common causes of delay with a view to revising the current help desk work model. This outcome will then be used by the systems team to focus the help-desk re-building process and hence it is hoped generate that of a more efficient and reliable service.

	Op	- Look for similarities between one or more things.
	relP	- apparent mismatches between company needs and programming staff recruited
	ga	-
	un	-
	ot	-
gi l \$a	yt Mi	- to op (activity) IT recruitment guidelines with current company tasks (spotlight) and their implementations
oi	Co	-
	Mo	- since this is largely looking at what might be called historical data it seems worthwhile to use h as the most suitable method
oi	btPn	- the essential task here is by a process as one compares the existing guidelines with the defined task specifications.
	dyasp	- none as a suitable I may be constructed at the collection stage by just using the guideline indices.
gi	un	- the list will be processed to obtain a set of recommendations on a revised set of guidelines that better reflect company needs as found in the required tasks. The principle processing mechanism will be to use the existing task cost structures and the company staffing policy to arrive at the result. This outcome will then be used by team leaders and heads of department to focus their staffing needs in software development into an accurate and lucid job descriptions and hence generate the list of reduced recruitment costs and accurate selection of new staff to fit the required job profiles.

	eOp	- similar to list but here the implications is your are searching many sources and having to make decisions in the process
	relP	-
	ga	-
	un	-
	ot	-
gi l \$a	yt Mi	- to op el i (activity)
oi	Co	-
	Mo	-
btPoi	te l	-
	dyasp	-
gi	un	-

bi	Look for differences between one or more things.
Sal	- apparent mismatches between company needs and programming staff recruited
yt	-
ni	-
At	-
bi Sal	(activity) IT re recruitment guidelines with current company tasks (spotlight)
yt ni	-
At	- since this is largely looking at what might be called historical data it seems worthwhile to use as the most suitable method
bi Sal	- the essential task here is by a process as one contrast the existing guidelines with the defined task specifications.
yt ni	- none as a suitable may be constructed at the collection stage by just using the guideline indices.
At	- the list will be processed to obtain a set on a revised set that better reflect company needs as found in the required tasks. The principle processing mechanism will be to use the existing task cost structures and the company staffing policy to arrive at the new guidelines. This outcome will then be used by team leaders and heads of department to focus their staffing needs in software development into an accurate and lucid job description and hence generate the of reduced recruitment costs and accurate selection of new staff to fit the required job profiles.

bi	- Make a judgement, backed by a discussion of the evidence or reasoning involved, about the merits of theories, opinions,...
Sal	- apparent bottlenecks in the repayment system causing customer complaints and miss-payments
yt	-
ni	-
At	-
bi Sal	- to form (activity) of each stage of the current repayment work flow (spotlight) with regard to IT usage....
yt ni	-
At	- as my main aim here is to improve the flow in some way I have decided to
bi Sal	based on the workflow definitions will be the main collection vehicle here.
yt ni	- this will look for outliers and clusters in the critique summaries and form them into in a prioritised order.
At	- this will be in two stages. The first stage will look at outliers as they are normally indicative of underlying problems themes. The second stage will look at clusters as this implies similarity and that may point to where future IT deployments may best be sited. These two sections will then be used to generate the outcome of that can be used by finance managers to continually monitor the repayment cycle in the future and hence generate that of functional repayment cycle which is reliable and verifiable

bi	- State the exact meaning you are attaching to a word, phrase, idea, process etc
RP	- apparent transaction losses
ga	-
de	-
de	-
bi \$a	– do it (activity) the state of each logged transaction within the scope of the current network transmission protocol (spotlight)
oi	-
de	- this study will look at a large number of transactions and the essential method is therefore
btPoi	- transactions data will be extracted automatically from the log by means of a software application. The software will also tag the various transaction types according to metrics defined in the literature to form a set of transaction definitions.
gisp	- none as a structured collection with be available via the automate collection stage
gisp	- the processing will automatically scale the data and display it in graphical form and of particular interest is transactions that might be regarded as outliers as they may be anomalous and point to processing sequences or other error types. Once the outliers are known it will be possible to produce as an outcome a set of verifiable metrics that can be used to predict which transactions are likely to cause process cycle difficulties and hence remedies can be sought in order to achieve that of reduced transaction losses.

bi	- This may be used freely to describe in detail situations, events, opinions, feelings and so on.
RP	- lack of trust in security checking
ga	-
de	-
de	-
bi \$a	– do it (activity) differences in network penetration test results carried out over several test periods (spotlight).
oi	-
de	- since we are essentially looking at historical data the method used will be used
btPoi	– the various discrepancies uncovered will be classified into severity levels and presented in a format with administrator comments and a description of why it might have been missed on the previous test cycle.
gisp	– Using the structured primary data set and methods used in the testing suite attempts will be made to identify test scope factors that may have allowed faults to be overlooked and hence expose the network to unnecessary risk and hence generate the outcome of a revised testing suite so as to achieve that of a security assured network.

et al	self ID	- Look for elements that would clearly differentiate between two or more things
mbP		- poor IT utilization amongst middle level managers
ga		-
de		-
ok		-
day m i A		- to explore the cultural milieu in which managers of an organisation exist various cultural elements (spotlight) that are present.
oi Coe		-
how		- in this I feel I need to immerse myself in the day to day life of managers in order to see how that milieu might point to how IT training might be used by them and this makes me think of the research method of E
bt Poi t C		- this is a slightly sensitive area so it seem best to use based on spending long sessions within the managers department coupled with informal
apiesP		- the raw primary data will be in the form of a mixture of short and long notes plus some formal interview transcripts as well as some video and photographic information. With the rich information base an attempt will be made to extract typical ethnographic elements such as: behaviours, structures, functions, roles, politics and communication styles. The extracted data will be carefully organised into categories within these categories.
gisa		- using the structured primary data collection I will attempt to match cultural themes found within a manager's department with a training mode that might be best suited for that culture. The basis of the matching will be to use the 5 stage learning model developed by Garlick (1999) so that in essence we link learning progression to its cultural suitability. The outcome will be presented as an IT training plan and used by the manager's forum to adjust their personal training portfolio so as to achieve the goal of higher IT utilization leading to more effective middle level management.

SD	- Explain something by giving two sides of the argument
NP	- non IT personnel are reluctant to engage in computer user training
GA	-
MA	-
DA	-
DAyt iA	- said (activity) the function of IT training for non-IT personnel (spotlight).
oi Coe	-
MoCo	- this is essential and it therefore seems best given the wide diversity of opinion that is likely to emerge to use the method.
bt Poi tC	- a presentation will be made in sessions and this will be followed by a discussion. Although this is a survey I have chosen this method as I want it to be a learning experience for all involved as well so in effect I will be looking to see if the seminar assists in forming opinions.
ArgiP	- the seminar discussion notes will be structured by looking for the usual text processing elements such as: common threads, outliers, labelling, etc and formed into a report.
giCo	- the outcome is to provide a vital insight into the company and this will be generated by looking at the elements identified in pre-processing and knowing these have emerged from a sample the attempt will be made to say what it might mean for the whole company - can it apply to the whole company, is there some important element in this theme that has much wider implications, is there a principle that can be established, can I construct a theory and so on. The outcome will be presented to company and training management with a view to informing them of the general feelings and desires of the wider non-IT workforce so that they can be taken into account in the construction of future training plans and personal training portfolios that better fit with worker needs and aspirations

		- In some cases one might want to look at events or people or processes in order to form an evaluation and that collection of (usually) small evaluations form our primary data.
		– unemployed people's disappointment in their inability to locate an appropriate job
		–
		–
		–
bi l \$ ad y t i i		(activity) the elements functioning negatively and positively in job searches (spotlight).
oi		–
Mode	de	– I am looking for the various factors that might be involved in job searching. Many of these will of course be well known such as qualification or skills but there may be many other that are not so obvious such as ethnicity, age, sexual orientation to name but a few. With this in mind I intend to explore this area looking for suitable illustrations of these factors and how they acted negatively or positively with regard to obtaining employment and so I feel the method of V is most likely to be valuable here.
bt Poi	te l	– My procedure will involve jobless 18-25 year olds (plenty can be found in job centres) in a defined inner city to collect illustrations of successful and unsuccessful job searches.
		– the interview transcripts will contain what amounts to suitable illustrations so these will be extracted and standardised based on a simple job seeker profile of successful and unsuccessful job searches illustrations.
gi		– using the illustration portfolio will be devised that when coupled with a standard job
el i	tp	can be used to enhance a web search for suitable employment opportunities. The outcome of the and I will be made available to job seekers and web job search system providers in order that that of effective and satisfying web searches can be achieved.

		- Look carefully at the details of an argument, theory, or plan etc
		– frustration at the apparent time wasted on electronic correspondence
		–
		–
		–
bi l \$ ad y t i i		- to (activity) the various activities involved in the electronic correspondence process (spotlight) such as e-mail, fax, documents, photos, electronic forms, document and imaging process, accessing of images, routing/delegation functions according to the work flow process.
oi		–
Mode		– there are several main areas and I need to form a of the various technologies and processes so I will use the method and treat each communication area as a case study.
bt Poi	te l	– in this study I want to collect various communications samples and the practices associated with them in several areas and it seem best to do this by a series of with selected personnel from various levels in the company.
		– the collection phase will generate a large raw data set consisting of artefacts (samples provided in the interviews) and activity descriptions. It seems best therefore to organise these into a communication area/activity linked to an artefact sample.
gi		– I think it best to process the matrix and catalogue to derive some suggested best practice description in the various areas and then by means of arrive at agreement on what can be called best practice and hence construct an
oi	of t p e e t a b	in electronic communication and this can be used by individuals and training management to help ensure that of communication being viable, efficient and satisfying to participants.

na	- this is about saying why something is. So one can describe an event but also explain why it occurred
na	- serious concerns in some departments over impacts on working practices of a proposed new land registry application
na	-
na	-
na	-
gi \$a	na (activity) possible impact effects of a new land registry application system and database (spotlight) in common areas such as: cost, performance, user acceptance, etc
oi	-
na	- the suggested method here is an extended as the system itself is quite extensive
btPoi	- there will be three main mechanisms to establish expected benefits and then
si	to establish the consequences in the various areas
na	- the observations and focus group information will be compiled under various headings using a standardised format but will in large part be based on the companies stress model as the main aim here is to assess impacts but largely those will be people based impacts. The chosen method is to draw one based on the catalogued information so that various perceptions can be shared and as a final step carry out another where the pictures are examined and discussed.
gi	- the intended outcome will be generated based on a careful analysis of the catalogue produced in pre-processing. From the catalogue and the final focus group information a comprehensive will be compiled that can be used to assist in planning by management for the implementation of the new system and hence achieve that of alleviating genuine personnel concerns and preparing the organisation for a smooth transition.

na	- You can use this word but we are always exploring so it must be used with care. Typically, in these cases one starts with a model of some kind and uses that to inform the exploration process. For example, we might have a theoretical process map and we use it to explore various working processes to see if we can find flaws or weaknesses and then those descriptions of flaws or weaknesses become out primary data.
na	- loss of market potential for my company
na	-
na	-
na	-
gi \$a	na (activity) the company business profile with regard to its fit within the modern global economy and the use of the Internet and eMarketing/eCommerce (spotlight)
oi	-
na	- this and in this case it seem best to think of the whole company as one area and the need to clearly its business profile.
btPoi	- there is potentially a lot of information here and it might be in diverse places including just in people minds so it seems best to it coupled and then follow this up by sessions to share perceptions via Rich Pictures.
na	- The various interview transcripts and document extracts will be examined using normal text processing ideas to produce a detailed (products, policies, structure, finance, Issues, IT infrastructure, etc) supplemented by feedback from the seminar sessions.
gi	- armed with the full business description and Rich Pictures there will be an open discussion with consultants about creating an outcome for an eMarketing/eCommerce outlet with that of increasing the company's market potential based on using Porters 5 forces model as a starting point.

etarts	I	– Here one is trying to find a way to expresses in a very pointed way some situation or thing. So one might identify an instance of SPAM and then illustrate why it might be harmful so adding poignancy to the example you have extracted. Mostly, it is best to think of illustration as a way of giving an example but in that example you want to make just one clear point.
etP		– expressed dissatisfaction with the quality of delivery within a training organisation
et		–
et		–
et		–
gi \$a	et \$a	et \$a (activity) how a student's acceptance and satisfaction in a training course (spotlight) are affected by the various technologies that might be used.
oi		–
et		– this is a new area and I am not sure what sort of things will emerges so it is therefore largely
et		study and since I am aiming to find various factors that might be significant I think
et		method is the most appropriate.
et		– in this case I am looking for examples or illustrations of the various factors in action. It therefore seems appropriate to use
et		of participation activities that occur during training.
et		– the raw primary data will be in the form of simple illustrations of training activities and an assessments of the technology effects that were observed. This raw data will be processed to find a common
et		of illustrations that explain technology acceptance and satisfaction levels and each illustration will effectively define a training factor.
et		– using the catalogue of illustration and named factors a training
et		will be constructed that maximises both satisfaction and acceptance. This will be accomplished by using the standard model features and outline course learning objectives. The outcome will be used by trainers to re-model all course offerings and hence achieve
et		of higher satisfaction levels in our course provision.

et	I	– The essence here is that one is typically observing something to describe it but also to find some meaning in what is being done. This is often used when looking at social groups or situations where it is not always obvious why certain actions occur
etP		– getting more value out of POS systems
et		–
et		–
et		–
gi \$a	et \$a	– to be
oi		–
et		– given the large number of potential sample points here it seem obvious that
et		is the only feasible choice
et		– the protocol will be a survey of customers by means
et		to obtain data such as average age of buyer, degree of satisfaction, service speed etc. To balance this I will also obtain from the client such things as increase in perceived business value, improvements in customer relations, kiosk usage statistics etc.
et		– the interview data will be processed using the
et		methods with some
et		and all this data will be structured into
et		with the various factors identified during text processing – one matrix from a customer viewpoint and another from the retailer viewpoint.
et		– once the matrices and statistics are available I will construct
et		on the efficacy of this enhanced form of POS using the PESTLE (Political, Economic, Sociological, Technological, Legal and Environmental) model of analysis. This report will be useful to mangers contemplating this technology as it may help in pinpointing what conditions within the market place must exist for it to be successful and hence lead to
et		of getting more return on the POS systems.

		- Show adequate grounds for decisions and conclusions and answer the main objections likely to be made about them.
1.1	1.1.1	- suggested productivity gains in upgrading to MS Vista
1.1	1.1.2	-
1.1	1.1.3	-
1.1	1.1.4	-
1.1	1.1.5	- to attempt to (activity) a new function set (spotlight) based in expected productivity gains
1.1	1.1.6	-
1.1	1.1.7	- my basic aim here is to indicate (it is not possible to prove) the viability of productivity gains from an upgrade to Vista. It follows, that the essential method here is my means of a sample because it is not feasible to install Vista on the live environment since that would imply the decision to upgrade has effectively been made. It follows that for testing to be feasible any possibly justifications must be made in a simulated environment.
1.1	1.1.8	- the means here is a pilot based on a series of Vista function tests. To carry out the tests a series of known common tasks will be formulated covering general topics such as searching, surfing, organisation (of directories and files), ..., and products based on covering Word, Excel and PowerPoint. The process will be to use the series of common tasks as part of a training exercise in Vista with several staff recruited to carry this out. The recorded data will be exercise timings, accuracy achieved and a reflective diary kept by each participant coupled with the participant and observed function justification (why it might be useful or more useful than that available currently)
1.1	1.1.9	- this will be all functions tested and with various statistical calculations attached. The reflective diaries will be scanned on each function. This will be structured and ordered by function.
1.1	1.1.10	- the catalogued justification report will be analysed from three viewpoints: the first will be utility (how well did the function perform), likeability (how well was it received by participants) and potential cost benefits in terms of productivity in order to generate an outcome to management. This outcome can then be used to gain the support of an informed management on the expected gains/losses of the proposed upgrade.

		- This is often a neat way of dealing with some types of data where you think there is a relation but the relation itself is not known with any certainty. One often finds this kind of activity evidences in a matrix formulation or representation.
1.1	1.1.1	- inappropriate user behaviour in the use of their work based PC systems and networks leading to various undesirable side effect such as loss of bandwidth, virus infection, risk exposure etc.
1.1	1.1.2	-
1.1	1.1.3	-
1.1	1.1.4	-
1.1	1.1.5	- no I (activity) a security violation with a particular user behaviour (spotlight) - that will generate a primary data item (implicit here is that we also need a description of each violation and user behaviour).
1.1	1.1.6	-
1.1	1.1.7	- the basic method here is to use a log instrument as these inappropriate user behaviours are thought to be widespread in the organisation and there is therefore a need to monitor these actions.
1.1	1.1.8	- search and extract violations descriptions from the log using a text processing tool. This is a sensitive area and one is unlikely to get good data by any direct means. However, it will be used to explore user behaviours in general.
1.1	1.1.9	- the violation descriptions will be examined in a meeting with experts to establish the behaviours that caused the violation. To do this a matrix of violations linked to user behaviour is formed with a violation severity rating based on violation extent: local to department, local to PC, local to a particular system, local to the intranet or global to the company. The interview transcripts will be summarised using normal document extraction methods and presented to inform seminar participants
1.1	1.1.10	- I need not to use the prioritised matrix to develop a plan. Therefore I might search for an appropriate BS to guide me in the process or I might use a method called PLOT - but whatever I use it has to be such that it can be repeated by another person. The whole purpose of the process is that I can then draw up a plan that might help us achieve the goal of eliminating or at least reducing these inappropriate user behaviours. The outcome will be presented to management for approval and then implemented by the IT department with appropriate training and technological means.

gi l \$ ad yt ni i A aid b (activity) an engineer's activity for each migration service (spotlight).

ni C	-
U	- this study i past records of migration activities and it is al gited them and the services they support so it seems best to think of this y s e but based on historic data with a number of migrations examined.
bt Poi t l C	- the main protocol is de gi to extract the necessary data via online status reports and these may be supplemented u veni with engineers and/or the service providers.
g i s p	- Once I have collected my primary data I will structure it as i g t e with engineer activity and migration services noting cases where migration delays occurred. The table will be organised on a key activity idea where these key activities have been established by an examination of the project plan.
g i s p	- a migration model will be used to process the categorized table to d e g e n i p of key migration activities and used by project managers to get t i g t of reducing migration project overruns.

y t b	- This might be a useful verb if you were looking for types in a study. For example, if you were looking for people who get involved in illegal downloads one might want to portray them in some way.
nt p	- SPAM is junk mail and leads to high loading on infrastructures but this study will focus on the increasing level of complaints from users ranging from simple irritation to exceeded mail box quota lock-outs.
g t	-
u	-
o t	-
gi l \$ ad yt ni i A	- y t p (activity) SPAM instances (spotlight) by extracting messages from various server logs.
ni C	-
U	- methods of SPAM prevention are well known and for this study to be interesting it needs to uncover something new that might help in the SPAM elimination battle. One such element might be to portray various kinds of SPAM perpetrators and to this end the study v e l p e SPAM messages in order to discover these portraits and so it seem best to use the ide s t g v
bt Poi t l C	- since we need to look at messages there is an inherent risk that they also carry elements such as a virus of some kind which opening the message might trigger. For this reason the SPAM message d e n i l l b e t e using a tool which I will build so that the data can be examined in a secure environment.
g i s p	- messages will be examined for common structural features such as: header, topic, sender, method of reply etc - to build up profiles of a typical SPAM message types. Once the profiles are available each message will be standardised and then presented a g l a t e . Using the catalogue a second stage of pre-processing will examine each standardised message to profile each message element: header, address, body and so on and that additional information will be added to the catalogue. The principal mechanism used here in this standardising process is the usual text processing ideas of looking for key words, labels and so on.
g i s p	- using the SPAM message catalogue and element profiles the Cambridge profile model will be used to portray senders: introduction, personal needs, interests, skills, comparison with other similar profiles, message and profile match, conflicting indicators and message offering. These portrayals will be placed i g l a t e of SPAM perpetrators with commentary and used to get t i g t of informed users and also used by system managers as a guide to building SPAM secure systems.

aim	- Give a concise and lucid explanation or account of something, presenting the chief factors and omitting minor details and examples
imp	- over exposure of the corporation's data assets which may lead to data theft and increase reputation loss risk.
goal	-
method	-
outcome	-
activity	- to aim (activity) the corporation's data assets (spotlight) by defining their value, criticality, sensitivity and legal implications.
note	-
idea	- this research will solicit information on the data asset types, risk ratings and legal implications from the data owners and legal department so the use of ops will facilitate the timely and standardized collection of this data.
idea	- idea of recently completed Risk Reports for data value coupled with the use of i scripts to define data, its criticality and sensitivity and to determine legal implications.
step	- The primary data will be scanned to completed g showing data types by sensitivity, legal requirements, reputation and other risk
idea	- The data classification grid will be used to determine access permissions appropriate to a particular information asset based on an asset owner's assessment and be the baseline for the Corporation's data asset step . The protocol will be used in corporate governance to gain that of assured information assets.

step	- Resolve something into a whole from its component part.
imp	- there is a concern that provision of IT services is not aligned with strategic organisational goals.
goal	-
method	-
outcome	-
activity	- to step (activity) the various aspects of IT service delivery (spotlight) by examining delivered services to see what practices are involved.
note	-
idea	- in this case I need to gain a thorough idea of service delivery but at this stage I regard it as relatively unknown idea is needed and so it seems best to use step method to look for delivery exemplars or their opposite.
point	- essentially this is about business performance issues and how performance is assured in part at least by IT service. With this backdrop in mind I idea to trace various IT services and their outworking and effects in business units. For this to be successful it will be necessary to obtain a list and description from the IT department beforehand of the various IT services commonly used in the organisation that might be regarded as business critical.
step	- based on interview transcripts I will extract perceived uses and needs and match this to the service definitions provide by the IT department. The collection of data will be expressed in form and prioritised by a consideration of its essentiality to business but each entry will be a service delivery exemplar (positive or negative).
goal	- using the list of exemplars I will idea idea to
goal	to the current practices so that IT service delivery matches needs so that IT managers can use it to get to the
goal	of IT service goals being more strongly aligned with business goals.

Some of you seem to be getting their ideas in a muddle because they are striving to PROOVE something. In Research proving something is extremely difficult at the best of times and some things are impossible to prove. Writers going right back to the earliest times have grappled with the idea of proof and you will find the philosophical literature packed with books and articles on this one idea. We will be simple about it and start with the two, perhaps, main strands of thought: inductive and deductive reasoning.

Cause and Effect

It is as well when you read these notes to remember that everything one way or another has a cause. So if your accounting system malfunctions then there is cause or really a train of causes and effects: first effect is data input routine fails - cause of input routine failure programming error, causes of programming error is a mistake in the specification and so on.

Don't run away with this idea as in life there are many, many things where we can see the effects but have no chance of knowing the cause for certain: someone crashes into your car, you lose your wallet, you get short sighted and so on.

Research therefore is often at its root about seeing an effect and then looking for a cause. Once we know the cause we try to create something that we can use to remove the cause and so get rid of the effect we don't want by creating an effect we do want. For example, suppose the effect we see is misuse of IT resources for personal use (that is the effect we don't want) and let us for simplicity say that it is caused by people not knowing the rules of use so we can remedy this situation by creating a set of rules or a policy for IT usage and then when the rules or policy are used say by departmental managers we get rid of misuse (the effect we don't want) and instead we have productive use (the effect we do want).

It perhaps is worth noting here that we need two things: the outcome (rules/policy) and the actor (departmental manager) and that linking of outcome and actor will always be present.

Induction

This just means the inference of a general law from the observations of particular instances or sets of instances. What this means is that you notice something that happens and see that it happens often. It follows that you can infer or guess a general law from your observations. For example, you notice that people in your company tend to be more productive after IT training so you make a generalisation using induction and say "training in IT leads to personal productivity increase".

It is very important you understand that nothing has been proved here and all you have is an indication. It is not a proof because we cannot know what new IT tasks or technologies might occur in the future. One of the greatest modern philosophers, Popper, put it like this. "You can never accurately predict the future because it is impossible for men to know now what they, or others men, will know in the future". It follows that we are never possessed of the data that can allow us to make certain predictions about what may lie over the horizon based on our current stock of knowledge no matter how certain we feel about it.

Deduction

This just means inferring particular instances from a general law. So if for example we use Ohm's law we can predict with certainty the value of current if we know the resistance and voltage applied to a particular circuit.

In research we might think along either of these lines so for example we often set a hypothesis (a guess at general law) and then try to prove it. Alternatively we can go and collect data and by looking at the data see if we can work out what the law involved might be.

So if I were considering a link between personal productivity and IT training then I might take a deductive line and postulate the hypothesis (law if you like) "training always increases personal productivity" or I could take an inductive stance and just collect data and see if I can see (guess) what the "law" might be.

Comment on Induction and Deduction

There is no right and wrong approach here and it's a matter for you to consider what sort of outlook you are taking. Probably in technology we tend to take a more inductive attitude. Now it all may sound simple in the IT training case I mentioned above because using either stance one would collect more or less the same data but it will not always be that simple – for example supposed you were looking at the effects of IT system migration in a rapidly expanding company and project control methods used to manage it then it is now not obvious at all what the link between these two things might be so a deductive stance would be unsuitable here.

You might like to think of Sherlock Holmes the fictional detective of the Victorian era who was famous for making deductions. In one story called "The Cardboard Box" he visits a client and sees a photograph on the wall and deduces that the client has two sisters. If you like he used a general law: people have sisters and he uses that general law to deduce a particular instance of it: that his client has sisters. Notice here that such a deduction would not always be true but would be always reasonable.

You might further notice that this is not induction. It might look like it in that the photograph looks like data on which we might guess at some general law. This is not so however, since one cannot look at a photograph of three people and infer a law from it about sisters. Logically, we can say that many or most women have sisters therefore a particular woman probably has one. However, we cannot say a particular woman has a sister therefore all women have sisters. To put it more simply, we can say that if all boys are bad and Fred is a boy, therefore Fred is bad. But it is obvious we cannot say Fred is a bad boy therefore all boys are bad. In summary we cannot argue from the particular to the universal but we can argue from the Universal to the particular.

Proof

This means that the phenomenon we are looking at is always true. Now, in practice, proof might be constrained or unconstrained. For example Archimedes principle is unconstrained, meaning it is always true for everyone, all the time, everywhere and is accepted by all. But if we set up an experiment to try to prove that Google email is efficient – it will be constrained in that it is obvious that it is very unlikely to be true for everyone, all the time, everywhere and is accepted as true by everyone. In fact in this case it is severely constrained in that even if you managed to show statistically that it was true then at best one could only say that it applies to the sample used in the study. Additionally, using Poppers idea mentioned above it is obvious we cannot know what will happen in the future.

Notice that I say above that one characteristic of proof is that it is accepted by all but you would be surprised how often that is ignored. Just one ludicrous example will illustrate this, a student told me a story (it may be apocryphal) about an aged Saudi Arabian cleric who in 1977 issued a fatwa (a ruling) that the world was flat! So don't be surprised if people disagree with you even when the evidence seems overwhelming.

Indicators

This is where we talk about indicators - that is in the email study we might be deductive and infer or indicate that Google email is likely to be efficient for most users – that is indicators are not proof but generalisations made on the basis of some evidence (data) we might have. Think of it like this – suppose you invented a wonder pill that you claim would make you see in the dark. Now proving that it works for everyone, all the time and everywhere means that YOU are prepared to guarantee it is true. If it later turns out that for ME it did not work when I was driving my car at night and I ended up crashing and killing 40 goats, 2 chickens, a pedestrian and an onion salesman then I will sue you for £100M!

On the other hand we can be constrained and think in an inductive manner and say that "it has been shown to work in many cases" – that is all we are prepared to give is an indicator (a generalisation) because we have some evidence that it works but not a cast iron guarantee. You might like to link this idea of constrained to setting confidence intervals in statistics.

Sophistry

Much that you will read on the internet in particular can only be classed as sophistry that is clever but worthless argument. The Sophists arose as philosophers more or less at the same time as Socrates in ancient Greece and felt themselves to be very wise men who knew everything in contrast to Socrates who claimed he knew nothing. The Sophists it seems were not much interested in truth but only in winning an argument and many believe they in effect sowed the seeds of the demise of the Greek nation at that time. This may all have happened 2,500 years ago but their legacy lives on and the corrosive influences of their attitude is evident everywhere today and certainly in politics and religion.

As it happens I was discussing these ideas with a student a few days ago in this cohort and she pointed me to a site written by Dr Gary Miller. Dr Miller invites us to use his materials freely so I will do that to illustrate several things about proof. On this site he wrote many things which he regards are some sort of proof and he says it is possible to set standards for truth and talks about falsification tests. Here is one example of the kind of argument he uses.

(http://www.islamicinvitationcentre.com/articles/gary_miller/quran/Quran.htm#Intro)

An engineer at the University of Toronto who was interested in psychology and who had read something on it, conducted researched wrote a thesis on Efficiency of Group Discussions. The

purpose of his research was to find out how much people accomplish when they get together to talk in groups of two, three, ten, etc. The graph of his findings: people accomplish most when they talk in groups of two. Of course, this discovery was entirely beyond his expectations, but it is very old advice given in the Qur'an: "Say, 'I exhort you to one thing - that you stand for Allah, [assessing the truth] by twos and singly, and then reflect....'"

1. So we must look at this and see whether it can in any way be regarded as proof. We might easily observe straight away that there are no references and it is impossible for us to check what has been said as it's a hopeless task to find "An Engineer at the University..." He quotes the Qur'an but does not tell us the surah or the English translation it is taken from (or did he translate it himself or even just make it up). When you see this kind of extremely poor scholarship one has no alternative but to ignore Dr Miller's work entirely as it cannot be trusted. That does not mean Dr Miller is a bad person, all we are saying is that his work cannot be trusted.

2. You may also note that the quotation from the Qur'an is extremely short and that would make me wonder if he is just being very selective to try to make his own point – that is the quote in full might not support his conjecture so he ignores the bits that don't suit him. Again because we have no references we cannot easily check it.

Also notice that he adds something to the Qur'an "that you stand for Allah, [assessing the truth]" and so he perhaps forces an interpretation on the words "that you stand for Allah" but like any interpretation it is only one of many. Additionally, he assumes that it means assessing the truth of anything and it is almost impossible to see that the actual Qur'anic verses are saying that. Overall this looks like Dr Miller is being tendentious (the author simply wants to convince you of something and may use any means to do it) in the extreme.

3. What is he trying to prove here? That the Qur'an agrees with an Engineer's findings? That the Engineer has verified something the Qur'an has said? Is he offering an interpretation of the Engineer's finding or the Qur'an. We simply don't know for sure what point he is making.

4. It is interesting to note here that if this Engineer or the Qur'an is saying that working in two's is powerful he might like to recall that Socrates made the same observation, which he called his dialectical, with impeccable logic about 2,500 years before the Engineer was even born and about 1,000 years before any copies of the Qur'an existed. If you want to follow this up there is an excellent tape by Mark Forstater called "The Living Wisdom of Socrates", Hodder Headline Audio books which is a very engaging introduction to the teaching and life of Socrates.

This point is quite important and that is why we must read widely otherwise we may well think we have discovered something only to find that it is already known and published and we end up making an ass of ourselves because we have not prepared properly. At worst of course this can also look like plagiarism – to take my example a little further we could argue then that Engineer and the Qur'an both plagiarised the idea of Socrates – but of course we take the obvious solution to be that the Engineer and Prophet Mohammed had no knowledge of Socrates. Whilst we might easily allow that Prophet Mohammed had no knowledge of Greek thinkers (there were no great libraries or the internet 1,400 years ago) we are much less inclined to forgive this Engineer or Dr Miller for not knowing something about Socrates, perhaps the greatest thinker of all time.

In short what this example is saying is that you must be sceptical and careful with what people say and you must ask for evidence. Now of course in everyday life we don't question everything we hear or read otherwise life would be an impossibility but we must always be aware that things may not be what they seem and of course in research and what we read we do need to carefully question what it is because we want to be credible and not make a laughingstock of ourselves.

Ways of Dealing with Proof

There are a number of ways of dealing with this idea of proof and I shall just briefly review them.

Hypothesis

With regard to proof, many students like to write out a hypothesis. There are two stages: write the null and alternative hypothesis and then write down the two (usually) variables involved (dependent and independent variables). Unfortunately these two things are often not done satisfactorily. Let me illustrate.

A student wanted to prove something so he wrote a hypothesis that essentially said that there was a link between IT certification training and personal productivity in support roles. He then went on to define the variables as: Role of IT (independent) and Personal Productivity (dependent). Now this will ONLY makes

sense if you can quantify the variables productivity (which is quite easy) and 'Role of IT' which it seems cannot be quantified.

Now in research people tend to treat the idea of hypothesis and the notion of proof in two ways:

Formal - to set up an experiment with two samples one exposed to some effect and one not. So just to be simple I could set up a hypothesis based on say those who have been trained and those not and see if there is any difference in their productivity. This is quite complicated and difficult to do. Even then what would it mean if I could show that there was a link – would it be true/false for all time, everyone and everywhere or would it just be true/false for my sample?

Informal - Instead we could just have what might be called a tentative hypothesis that suggests that there may be a link and then use case studies to demonstrate this. Notice that we are NOT proving anything here only indicating/suggesting something might be true.

Setting Standards/Definitions

It is easily acknowledged that in normal life we can almost never get what one might call absolute proof. In courts of law for example they talk about the evidence being "beyond reasonable doubt" or based on "the balance of probabilities" – in other words you get enough information to convince (but not absolutely prove) you of the truth. This may be done in many ways but usually one lists the things one wants to see. For example, if I wanted to prove that Manchester United is the best football team in the world (they are not because everyone knows that is Arsenal!) then I might lay out my standard or definition for proof: no of goals scored, championships won, number of world class players and so on.

There are three problems with this approach: whoever you are talking to has to agree to your standards or definition, if I can prove it today will it still be true tomorrow and once one knows the standards it is all too easy to find the necessary evidence (one might often say manufacture the evidence).

If you want to think more about this you could look at the way Socrates 2,500 years ago uses this idea in his dialogues - one of the most famous was about beauty. Socrates was by all accounts ugly and he entered into debate with Critobulus who was a very handsome man. Socrates simply asked Critobulus what standard or definition of beauty he was using and Critobulus duly offered a definition which on the surface sounds credible. Socrates, then easily proved using the definition that in fact, contrary to popular opinion Socrates was handsome and Critobulus ugly - an obvious absurdity to any observer of beauty!

A vignette may help you here. I came across a true story of a man who had been married for many years but regularly had nightmares as to whether his wife really loved him. He was so bothered by this that he went to see a Church Minister and was told one way (standard/definition) to find proof (evidence) of love was to consider all the little things you wife does for you: wash you shirts, clear you shoes, cook your meals, look after you when you are ill and so on. You can see the "proofs" would be observable but is it really proof, will that man accept the standard or not, will it still be true in a year's time and if the wife knows the standard will she just manufacture the evidence? The fact is that one can never know the answer here absolutely and there will be many things in life that simply cannot be absolutely proved in any rational manner and all that can be done is to feel convinced.

Falsification

This means that a proof is like a chain with links – break one link and the chain fails. So in proof if you can find one contrary example then the proof fails. In life of course it is all too easy to just ignore contrary opinion or examples and go on only looking for supporting ones. No doubt you have come across many people like this (you or I may be one of them!!), no matter what you say to them they refused to be shifted from their own view even when the evidence is there.

Sometime you see this very strong idea distorted. Where you see this is with authors who try to show that X is untrue and then say that Y is therefore true. I am not talking here about a hypothesis because often there is no link at all between X and Y. As you may know from many of my examples, I am a student of ancient manuscripts and one argument I have seen many time is this one. The ancient Bible manuscripts are corrupted – that is over time the original manuscripts have been lost but copies were made but added to, changed and so on. Now it is easy to show that there has been corruption and no serious scholar would think otherwise. Now what many proponents of other religions and humanists have said is because that is true (the manuscripts have become corrupted) then their sacred book or idea is not. The argument is something like "I can show that Ford is a bad car therefore Volkswagen is a good one" or even more starkly, "you are wrong therefore I am right."

Note. Just in case you are worried there are such a large number of Bible manuscripts that it is in fact easy to reconstruct the original autographs. Incidentally, the same arguments have been used about the great Greek writers and Shakespeare.

Just to whet your appetite I might say that scholars who use the ancient manuscripts have what is called a “critical apparatus” or a process if you like for reconstruction of the original. Later I will be introducing you to various critical apparatus that you will be using to process data in your project. In technology we don’t usually say critical apparatus but instead we say Research Method or more simply problem solving method.

Proof by the Unexpected

Most often when we are working on a topic we have an expectation about the answer so that when we actually see it we feel sort of reassured about it. Now, sometimes we can be surprised and startled by an answer because it is just “too good to be true”. If one takes my hobby as an example, whenever an ancient manuscript is found we expected it to be corrupted or contain errors or emendations – why? Because before the days of the printing press it is just about impossible that a scribe could copy a document of any length by hand without making any errors or not being tempted to “correct” the manuscript or “improve” it in some way.

Sometimes the errors were deliberate because someone wanted the manuscript to take on his particular viewpoint or often it was done for gain. Shakespeare was often illegally “simplified” so that copies could be sold in the street or around theatres for profit.

Therefore if any one comes along and says their manuscript is not corrupted we automatically take a very, very sceptical attitude – it is just not credible and one tends to say it is probably a later forgery or at least there must be something wrong with it.

To give a technical example, some years ago I was researching software testing ideas and I had 5 sets of data based on different criteria. Scatter plots were used and the results from set 4 were just “perfect” and I was almost dancing with joy, a bit like Archimedes I wanted to cry out “Eureka” as I thought I had really uncovered a very important principle. However, the results were just “too good to be true” so that scepticism kicked in and I thought I have to check this. Sadly, what I had done was include just one sample point from test sequence 1 into the data for test sequence 4 and that one mistake had biased the results to such an extent that they were worthless.

Proof by Example

Many authors try argument as a way of proof. One often sees this in religion and politics but it is also present in many technical papers we see. The idea is that I present my view on something and then proceed to “prove” it by instancing examples that endorse its truth and often those who use this idea challenge you to find a contrary example.

I rather like this approach but one just needs to be ultra careful that we are not taken in by our own arguments and get to a stage where we just want to keep convincing ourselves that we are right and fail to see weaknesses in our own thinking. When you use this form your logic must be impeccable and you must get evidence that can be checked but always keep in mind that your arguments are almost bound to be constrained. Dr Miller’s page above is a useful one to look at as he rarely uses any sort of consistent logic or evidence and frankly seems to have lost all sense of scope and now sees everything and every example as supporting his own ideas.

Does it Work

It is always very strong when you can show that something works. That is you have a theory and although you perhaps cannot prove it in any absolute sense you can show that it works by citing examples. For example, some project management techniques are like this as we can see them working but if one is sensible one just recommends them as likely to work as no one would be willing to offer a guarantee that they always work no matter what the circumstances or project.

Reading

Monk, R and Raphael, F (ed), (2000), *The Great Philosophers* published, Phoenix ISBN 0-75381-136-7

Project Proposal –

1. Title –Document Management strategies (78)

2. Background-

Document management strategy is intrinsically linked to the development, evolution and optimization of its operating processes in many organizations. Document Management for the Enterprise simplifies the principles of document engineering and management. Document management is one tool among several collaborative computing tools necessary for users to manage information.

3. Presenting market potential –

The company's massive scope of operations and their geographical spread meant that large volumes of data of varied genre were being created at dispersed locations. So now it is essential for organizations to organized contents/ documents in a way that optimized its usefulness to multiple users across the organization. Document management solution should reduce cost of ownership for both purchase and administration by integrating document management into an existing collaborative/information management solution.

4. Real-world target-

Convince organization to implement document management strategies which will enable them to access information dispersed throughout the organization, whether local or global and effectively provides quick, easy access to information regardless of the source.

5. Research question –

To develop and agree whole-life document management strategy and implement a solution that will cover both internal and external procedures with standards for processes and document.

6. Personal theory –

To overcome information overload by giving users the ability to organize, filter, prioritize and manage a variety of data types we need to convince enterprises to implement document Management strategies in business processes.

7. Intended project outcome –

My expected outcome will be set of benefits and explanation of in- depth features and functionality of data management strategies in maintaining huge data bases in enterprises.

8. Strategic IT value –

By Uniting the various repositories for files and documents organization can keep track of their data bases by date, process, type, status and priority wise to efficiently maintain their business processes. Document management solution handles documents by electronically storing, organizing, indexing and filing. They can be retrieved when required, without any loss of time. The cost of miss management of documents is too high.

9. Design for collecting data –

Scope of this study to know the life cycle management of documents to draw what kind of

benefits firms can make by implementing a document management system in current business processes.

10. Design for processing primary data -

Study the behavior and attitudes of different industries with the help of cases and tools which they have implemented and leveraging the strengths in best possible means to improve their customer centricity in low cost by using document management strategies.

Project Proposal –

1. Title – Impact of IT on international supply chain management (36)

2. Background-

Supply chain management (SCM) is the practice of coordinating the design, procurement, and flow of goods, services, information and finances, from raw material to parts supplier, to manufacturer to distributor, to retailer to consumer. This process includes product design, order generation, order taking, information feedback and the efficient and timely delivery of goods and services.

3. Presenting market potential –

Information technology and the Internet have revolutionized the way companies do business. They have changed the way organizations operate by enabling the re-engineering of sourcing, production and logistics processes

4. Real-world target-

The classic objective of logistics is to be able to have the right products in the right quantities (at the right place) at the right moment at minimal cost. Increased competition, ever expanding product variety, and more demanding consumers require more efficient supply chains

5. Research question –

How to effectively manage the supply chain using information technology is a topic of discussion in all levels of management, regardless of industries?

6. Personal theory –

I think IT in SCM presents both challenges and opportunities for supply chain managers because of its ability to collapse time and distance. Keeping this in mind firm needs to be understand the implication of supply chain management implementation in their transaction processes.

7. Intended project outcome –

My expected outcome will be a set of examples probing the utilization of IT in supporting supply chain management by developing a set of metrics to monitor the supply chain so that it is efficient, costs less and delivers high quality and value to customers.

8. Strategic IT value –

This research study provides a realistic portrayal of a key benefit of information technologies in supporting buyer-seller relationships. Using IT in SCM companies can follow a practice known as just-in-time manufacturing, and it allows companies to reduce the amount of inventory that they keep. This can cut costs substantially, since they no longer required to produce and store excess goods.

9. Design for collecting data –

I will collect the sample data from companies willing to share openly their results which have achieved using Information technology in their supply chain management.

10. Design for processing primary data –

On data collection an analysis will be done which will include the process description and the technology used. The in-depth benefits will be identified on the basis of qualitative and quantitative data available.

Project Proposal –

1. Title – High speed Broadband and its business impact (197)

2. Background-

High-speed Internet access or “broadband” allows users to access the Internet and Internet-related services at significantly higher speeds than those available through “dial-up” Internet access services. Broadband allows users to access information via the Internet using one of several high-speed transmission technologies.

3. Presenting market potential –

Broadband extends the LAN over the geographical boundaries and enables maximum interactivity. There are a large number of processes that can be put on line and enabled by the Network to make it easier and handy. For example Workforce optimization, many human resources administrative functions can be processed on-line, vacation approval, performance reviews, and definition of fiscal year MBO's and action plans, among others. Many software updates and technical ICT issues can be also addressed on-line.

4. Real-world target-

Having broadband connections in remote and rural area can be used as a e-business tool to buy and sell various goods and services over the internet thus saving lot of time and cost. Other areas of usefulness can be healthcare, education and government services to name a few.

5. Research question –

How broadband availability can have an important impact upon the productivity and growth of both business organizations and national economies?

6. Personal theory –

Broadband is predicted to have a considerable impact on small and medium-sized enterprises (SMEs) bringing the advantages of high-speed, high-capacity communications within their reach. Also the rural community can use broadband as an e-business tool to buy n sell various services and thus contributing to boast up the economy.

7. Intended project outcome –

The output will be a set of in-depth business case studies providing background information on each business and detailing the business case and subsequent benefits of a broadband Internet connection.

8. Strategic IT value –

Adaptation of broadband, e-commerce and public websites have allowed small and medium-sized enterprises to deliver new productivity, efficiency and an enhanced customer experience to their business while leveraging their limited human resources.

9. Design for collecting data –

My process will follow case study by involving industries experience in using high speed broadband connection at work.

10. Design for processing primary data -

Once the secondary data is collected I will outline the benefits/advantage and barriers of using broadband service in different industries.

Project Proposal –

1. Title –Document Management strategies (78)

2. Background-

Document management strategy is intrinsically linked to the development, evolution and optimization of its operating processes in many organizations. Document Management for the Enterprise simplifies the principles of document engineering and management. Document management is one tool among several collaborative computing tools necessary for users to manage information.

3. Presenting market potential –

The company's massive scope of operations and their geographical spread meant that large volumes of data of varied genre were being created at dispersed locations. So now it is essential for organizations to organize contents/ documents in a way that optimized its usefulness to multiple users across the organization. Document management solution should reduce cost of ownership for both purchase and administration by integrating document management into an existing collaborative/information management solution.

4. Real-world target-

إقتراح للشركات لتطبيق برنامج Documentum

Convince organization to implement document management strategies which will enable them to access information dispersed throughout the organization, whether local or global and effectively provides quick, easy access to information regardless of the source.

5. Research question –

To develop and agree whole-life document management strategy and implement a solution that will cover both internal and external procedures with standards for processes and document.

6. Personal theory –

To overcome information overload by giving users the ability to organize, filter, prioritize and manage a variety of data types we need to convince enterprises to implement document Management strategies in business processes.

7. Intended project outcome –

My expected outcome will be set of benefits and explanation of in- depth features and functionality of data management strategies in maintaining huge data bases in enterprises.

8. Strategic IT value –

By Uniting the various repositories for files and documents organization can keep track of their data bases by date, process, type, status and priority wise to efficiently maintain their business processes. Document management solution handles documents by electronically storing, organizing, indexing and filing. They can be retrieved when required, without any loss of time. The cost of miss management of documents is too high.

9. Design for collecting data –

Scope of this study to know the life cycle management of documents to draw what kind of benefits firms can make by implementing a document management system in current business processes.

10. Design for processing primary data -

Study the behavior and attitudes of different industries with the help of cases and tools which they have implemented and leveraging the strengths in best possible means to improve their customer centricity in low cost by using document management strategies.